WHO Technical Report Series
944

WHO EXPERT COMMITTEE ON PROBLEMS RELATED TO ALCOHOL CONSUMPTION

Second Report

The disease burden attributable to alcohol consumption is significant and, in many countries, public health problems caused by harmful use of alcohol represent a substantial health, social and economic burden. Reduction of the alcohol-attributable burden is becoming a priority area for international public health. Alcohol-related harm can be reduced through the implementation of proven alcohol strategies, including at a global level.

This report of a WHO Expert Committee reviews the health and social consequences of alcohol consumption and disease burden attributable to alcohol in the context of alcohol-related harm and recent trends in alcohol consumption worldwide. Based on the reviews of available evidence, including the latest data on the contribution of alcohol consumption to the global disease burden, the Committee makes several recommendations emphasizing WHO's role in coordinating a global response, and the need for global action to reduce alcohol-related harm through effective mechanisms of international action and country support.

The Committee recommends a range of strategies and policy options that have a sound evidence base and global relevance for reducing alcohol-related harm, emphasizing that their adaptation and implementation at the national and sub-national levels should take into account specific cultural and legal contexts and the local configuration of alcohol problems. The Committee also recommends that WHO should support governments, particularly in low- and middle-income countries, in developing, implementing and evaluating national and sub-national evidence-based policies, action plans and programmes. The Committee's conclusions and recommendations have significant implications for future developments in this area.

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Geneva, 10–13 October 2006

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1. Introduction

A World Health Organization (WHO) Expert Committee on Problems Related to Alcohol Consumption met in Geneva from 10 to 13 October 2006.

The meeting was opened by Dr B. Saraceno, Director, Department of Mental Health and Substance Abuse, WHO headquarters, Geneva, Switzerland, who noted that, since the adoption in 2005 by the Fifty-eighth World Health Assembly of resolution WHA58.26 on "Public health problems caused by harmful use of alcohol", there had been intense activity at the global and regional levels in WHO. In the WHO European Region, the Framework for alcohol policy, building on the European Alcohol Action Plan 2000–2005, had been endorsed and adopted at the Regional Committee in September 2005; in the WHO Region of the Americas the first Pan American Conference on Alcohol Public Policies had been held in Brasília, in November 2005; in the WHO African Region, a WHO Technical Consultation on the Public Health Problems caused by harmful use of alcohol in the African Region had taken place in May 2006; in the WHO South-East Asia Region, a resolution on alcohol consumption control policy options had been adopted by the Regional Committee in August 2006; in the WHO Eastern Mediterranean Region, the Regional Committee had passed a resolution on the public health problems of alcohol consumption in September 2006; and in the WHO Western Pacific Region, a resolution had been passed in September 2006, endorsing the regional strategy to reduce alcohol-related harm. At the global level, the WHO Secretariat conducted several technical expert meetings and had started an intensive consultative process with main stakeholders through organizing several meetings and consultations with civil society groups, scientists and representatives of the industry, trade and agricultural sector. Dr Saraceno emphasized that the Committee's recommendations would be used by the WHO Secretariat in the process of developing further activities to reduce health and social problems attributable to alcohol consumption.

In her welcoming address on behalf of the Director-General of WHO, Dr C. Le Galès-Camus, Assistant Director-General, Noncommunicable Diseases and Mental Health, WHO headquarters, Geneva, Switzerland, noted that the 2005 World Health Assembly resolution was an expression of concern by Member States about the public health problems caused by harmful use of alcohol. There had been increased attention to alcohol-related harm globally in recent years, especially since the publication of *The world health report 2002: reducing risks, promoting healthy life* which highlighted the role of alcohol consumption as a significant risk factor for global health. Available evidence indicated that the health and social problems caused by harmful use of alcohol were increasing in many countries as a result of rising levels

or changing patterns of consumption, particularly among women and young people. There were many perspectives on the most appropriate way forward in addressing concerns around public health problems attributable to alcohol, and the WHO Secretariat made concerted efforts to take those into account in the process of identifying realistic and effective approaches to reducing the negative health and social consequences of alcohol consumption. There was a need to develop recommendations for effective policies to reduce problems related to alcohol consumption, in accordance with the mandate given to the Organization by resolution WHA58.26, and for support to Member States in implementing and evaluating strategies and programmes.

1.1 Background

In resolution WHA58.26, the Fifty-eighth World Health Assembly in 2005 requested the Director-General "to report to the Sixtieth World Health Assembly on evidence-based strategies and interventions to reduce alcohol-related harm, including a comprehensive assessment of public-health problems caused by harmful use of alcohol" and "to draw up recommendations for effective policies and interventions to reduce alcohol-related harm".

To this end, a WHO Expert Committee on Problems Related to Alcohol Consumption was convened with the main objectives of reviewing a range of public health problems attributable to alcohol consumption, as well as scientific and empirical evidence of effectiveness of different policy options, and providing technical recommendations on effective policies and interventions to reduce alcohol-related harm.

The situation with respect to alcohol consumption and related health and social consequences has changed substantially since the previous meeting, in 1979, of the WHO Expert Committee on Problems Related to Alcohol Consumption. In its report, the 1979 Expert Committee concluded that, "in view of the wide diversity of the medical and social ills and human suffering resulting from the consumption of alcoholic beverages, the limited efficacy and high cost of the existing treatment or management of most of these problems, and their high prevalence in many parts of the world, the Committee recommends that: (a) prevention should be given clear priority; (b) further investment in treatment should be concentrated on developing inexpensive and cost-effective services" (*1*). The report noted that the damage caused by the consumption of alcohol is closely related to the level of consumption of both individuals and populations; that governments should therefore begin to reduce consumption by reducing the availability of alcoholic beverages and by taking educational and other measures to reduce demand; that well-designed educational measures, which have the potential of reducing the demand for alcohol as well as preparing for the

introduction of control legislation, should be developed; and that policies with respect to the advertising of alcohol should be reviewed in order to make them consistent with educational efforts to reduce demand. The Expert Committee recommended that governments should initiate and implement comprehensive national alcohol policies, and bring the serious public health consequences and the high social and economic costs resulting from rising alcohol consumption to the notice of national, regional and international authorities when policies and trade agreements involving alcoholic beverages are being developed; and that WHO, in collaboration with other international organizations, should give close attention to existing and future trade policies and agreements potentially affecting the availability of alcoholic beverages.

In 1992, the WHO Expert Committee on Drug Dependence considered approaches to prevention and the treatment responses to the harmful use of psychoactive substances, and in its Twenty-eighth report emphasized the need for an integrated national policy on psychoactive substances (*2*). Four years later, the WHO Expert Committee on Drug Dependence considered treatment issues and the development of treatment systems for conditions related to the use of psychoactive substances. In its Thirtieth report the Committee recommended that WHO "should encourage countries to give equal attention to measures to reduce demand for psychoactive substances and to efforts to reduce their supply" (*3*).

Since the last meeting of the WHO Expert Committee on Problems Related to Alcohol Consumption, WHO has undertaken a range of major initiatives to support Member States and reinforce the evidence on which policies work, to develop global and regional information systems, and to promote effective policies in health-care settings. These initiatives provide the background for the continuing role of WHO in supporting Member States to reduce the harm done by alcohol.

1.2 Framework and terminology

The Committee viewed the World Health Declaration, adopted by the world health community in 1998, as a framework for its deliberations. The Declaration reaffirmed WHO's commitment to the principle enunciated in its Constitution that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being; it recognized that the improvement of the health and well-being of people is the ultimate aim of social and economic development; and it emphasized the importance of reducing social and economic inequities in improving the health of the whole population. Therefore, it is imperative to pay the greatest attention to those most in need, burdened by ill-health, receiving inadequate services for health or affected by poverty.

The Committee regards "alcohol-related harm" and "problems related to alcohol consumption" as equivalent terms, referring to the wide variety of health and social problems, to the drinker and to others, at individual and at collective levels, in which alcohol plays a causal role. Related to one of these terms is "harmful use of alcohol", a category in the ICD-10 classification of mental and behavioural disorders, which refers to a condition in which physical or psychological harm has occurred to the individual as a result of his or her drinking. "Harmful use" in this sense is included in alcohol-related harms or problems. But in a public health perspective, considering the harms to others from drinking and the broader meaning of health in WHO's terminology, "alcohol-related harms" has a wider meaning. In a public health perspective, also, our frame is not limited to occasions when harm has occurred, but must also be concerned with the risk of harm, as it is associated, for instance, with particular amounts or patterns of drinking. The Committee adopted as its frame of reference, then, the whole range of problems or harms related to alcohol consumption, and the policies or other measures which will reduce as far as possible these problems or harms.

As used here, "alcohol policy", as a collective noun, refers to the set of measures in a jurisdiction or society aimed at minimizing the health and social harms from alcohol consumption. These measures may be in any governmental or societal sector, and may include measures which are not directly aimed at alcohol consumption; for instance, the promotion of alternatives to drinking, where such a measure has the aim of minimizing alcohol-related harms. A national alcohol policy will be made up of a set of individual policies, strategies, and implementing actions. There are also a variety of other policies which impinge on alcohol-related problems, increasing or reducing them, but which are neither normally described as alcohol policies nor normally included within an overall alcohol policy, since the policies are not adopted or implemented with the minimization of alcohol problems as a primary aim.

In the field of illicit drugs, policies are conventionally divided into supply reduction, demand reduction and harm reduction. The Committee considered this division, but does not adopt it in this report, since it may lead to confusion. Widely used categories of activities such as treatment or school education are hidden in the rather opaque term "demand reduction". More importantly, the overall aim of alcohol policies is to prevent or reduce the harm done by alcohol, and it is confusing to use the term "harm reduction" also for a subset of measures.

The Committee recognizes that WHO has sponsored or carried out substantial work on concepts and terminology concerning alcohol problems over many years. However, the primary orientation of this work has been towards clinical terminology and practice. The Committee considers it important

that WHO continue work on international concepts and terminology in the alcohol field considered from a public health perspective, paying particular attention to concepts and terms in diverse languages, and the translatability of the terms.

2. The mechanisms of harm from alcohol: intoxication, dependence and toxicity

Throughout recorded history, alcoholic beverages have been used in many societies for many purposes. As psychoactive substances, alcoholic beverages are used for their mood-changing properties. As intoxicants, they are used to escape sober reality. As liquids, they are used to quench thirst. As sources of calories, they are used as foodstuffs. Of course, whichever physical property of the beverage is sought by the user, to some degree it also necessarily carries the other properties. Apart from their physical properties, alcoholic beverages and their use also carry a wide variety of symbolic meanings, positive and negative. Depending on the culture, drinking alcoholic beverages may be a token of inclusion in or exclusion from a social group, a symbol of celebration, or a sacramental act. On the other hand, drinking or drunkenness may be socially disapproved of and stigmatized. In a WHO study in a wide variety of societies, "someone who is visibly drunk" was among the most stigmatized in a list of health conditions (*4*).

2.1 Types of alcohol-related harm, and their physiological basis

Whatever the social and personal valuation of alcoholic beverage use, positive or negative or mixed, drinking alcoholic beverages carries with it some potential for social and health harm, both to the drinker and to others. Some harms are immediate, notably injuries and other harms associated with intoxication or an elevated blood alcohol level. Others are more long-term, such as cumulative damage to family or work life or social position, or chronic damage to health. The Committee presents its findings on the nature and extent of such harms in the present-day world later in this report (section 4). As a framework for this, we consider here the three main mechanisms of harm from drinking alcoholic beverages: intoxication, dependence, and toxicity.

Much progress had been made since the 1979 meeting in understanding the pharmacology and neuroscience of alcohol (*5*). The structure and small size of the ethanol[2] (ethyl alcohol) molecule allows it to diffuse readily

[2] For the purpose of this report the terms "ethanol" and "alcohol" are used interchangeably.

across cell membranes and distribute through all cells and tissues upon ingestion. Alcohol ingestion thus has effects throughout the body. Even moderate intake can produce blood alcohol concentrations in the range of 10–20 mmol/litre. At such levels alcohol can acutely affect cell function by interacting with cellular proteins and membranes. At higher concentrations, or with repeated episodes, both acute and chronic effects multiply. As a psychoactive substance, alcohol also produces immediate effects on mood, motor function and thinking processes.

There is considerable individual variation in the effects of alcohol consumption. Not every chronic heavy drinker contracts liver cirrhosis. There is 3–4-fold variation in the rate of metabolism of alcohol between individuals, as a result of a range of factors including gender and genetic variation in liver enzymes (*6*). There is also a 2–3-fold variation in the pharmacodynamics of alcohol because of individual differences, which influences the extent to which individuals are affected by a given dose of alcohol. These individual differences affect alcohol-induced toxic and behavioural effects, drinking behaviour, the potential for the development of alcohol dependence, and the risk for alcohol-induced organ damage. As with other potentially harmful comestibles, social and health policies on alcohol need to take into consideration the whole range of human variation in effects, including the more vulnerable end of the spectrum, and this has implications for any policy relying on setting limits or guidelines for alcohol consumption.

2.2 Alcohol intoxication

Intoxication is a predictable consequence of the ingestion of substantial quantities of alcoholic beverages in a limited period of time. Most of the symptoms of alcohol intoxication are attributable to the effects of alcohol on a wide range of structures and processes in the central nervous system. On the one hand, intoxication is a clinical syndrome recognized in the International Classification of Diseases (F10.0 in ICD-10) and all too well-known to emergency service doctors and nurses in most parts of the world. On the other hand, there are wide cultural differences in how much drinking qualifies as intoxication, and in the behaviours associated with intoxication (*7*). Expectations of others about intoxication, and the extent to which it becomes an excuse for otherwise unacceptable behaviour, also vary between cultures and social groups (*8*). The occurrence of intoxication is thus subject to variation attributable to many factors, including not only the amount of alcohol consumed, how rapidly a given amount of alcohol is consumed and wide individual differences, but also sociocultural expectations and reactions.

The acute intoxicating effects of alcohol, combined with behaviours associated with it, can lead to a range of risk-taking behaviour (including unprotected sexual activity), accidents and injuries (including while driving

vehicles or operating machinery), violence, and acute alcohol poisoning. Some of these acute effects of drinking can lead to chronic problems such as disability in the case of injury, or infection with the human immunodeficiency virus in the case of unprotected sexual activity, particularly in areas of very high prevalence of HIV infection. These effects place a significant burden on health-care and emergency services. They also cause significant harm to third parties.

2.3 The dependence-producing properties of alcohol

Alcohol is a psychoactive substance with a known liability to produce dependence in humans and animals. If considered in the frame of the 1971 Convention on Psychotropic Substances, alcohol would qualify for scheduling as a substance that "has the capacity to produce a state of dependence, and central nervous system stimulation or depression, resulting in hallucinations or disturbances in motor function or thinking or behaviour or perception or mood", and for which "there is sufficient evidence that the substance is being … abused so as to constitute a public health and social problem warranting the placing of the substance under international control" (*9*).

This dependence liability has several interrelated mechanisms. Alcohol has reinforcing properties leading to repeated use of alcohol, and the core neural pathway believed to be the basis of this reinforcement is the mesolimbic dopaminergic pathway from the ventral tegmental area to the nucleus accumbens of the ventral striatum (*10*). Alcohol is also believed to achieve some of its rewarding effects through the endogenous opioid system. Alcohol shares the reinforcement mechanisms with other psychoactive substances.

The direct actions of alcohol on the brain and sustained alcohol exposure lead to longer–term molecular changes in the brain known as neuroadaptation. In many cases, neuroadaptation counteracts or reverses the acute actions of alcohol. Upon removal of alcohol, the adapted system overcompensates in the direction of excitation, resulting in withdrawal symptoms such as hyper-excitability, anxiety, and even seizures. The neuroadaptation that occurs with repeated alcohol exposure provides the basis for tolerance and the withdrawal syndrome (*5*).

At the experiential and behavioural levels, cravings for further drinking and difficulties in controlling alcohol use are among the hallmarks of dependence, and the varied aspects of dependence become mechanisms for continued heavy drinking despite adverse health or social effects.

2.4 Toxic effects of alcohol

Alcohol is a toxic substance related to more than 60 different disorders. For some chronic health conditions in which alcohol is implicated, such

as breast cancer among women, there is an increasing risk with increasing levels of alcohol consumption, with no evidence of a threshold effect. For some other conditions, such as liver cirrhosis, the risk is curvilinear, increasing geometrically with increasing consumption.

Alcohol is a potent teratogen. The most serious consequence of drinking during pregnancy is fetal alcohol syndrome, a developmental disorder characterized by craniofacial abnormalities, growth retardation, and nervous system impairments that may include mental disability.

Alcohol affects brain development, a process under tight temporal and spatial constraints, with each brain region having its own timetable for development. Alcohol has been shown to selectively exert its effects at the cellular and molecular levels on these developmental processes. Adolescents and young people are particularly vulnerable to the harmful effects of alcohol (*11*). During adolescence, alcohol can lead to structural changes in the hippocampus (a part of the brain involved in the learning process).

Repeated alcohol use can expose the liver to hypoxia, harmful products of alcohol metabolism and reactive oxygen chemicals, and protein adducts. In addition, alcohol increases the levels of circulating lipopolysaccharides, which, together with the above toxins, cause liver damage. Alcohol can also exacerbate hepatitis C. More than half of all patients with hepatitis C have a past history of alcohol use, and chronic alcohol consumption of more than five drinks per day in individuals with hepatitis C increases the rate of liver fibrosis, and the risk for cirrhosis, hepatocellular carcinoma and, possibly, death from liver disease (*12*).

Alcohol has been identified by the International Agency for Research on Cancer (IARC) as carcinogenic to humans (*13*). Several mechanisms have been identified for alcohol-associated carcinogenesis, including acetaldehyde formation, induction of CYP2E1 leading to formation of reactive oxygen species and enhanced pro-carcinogen activation, and modulation of cellular regeneration. Because of repeated exposure to acetaldehyde after alcohol consumption, individuals with inactive ALDH2 are at increased risk for upper gastrointestinal cancers.

Chronic alcohol use can lead to adverse immunological consequences. Numerous studies have documented wide-ranging deleterious effects on both innate and adaptive immunity from acute and chronic alcohol use. People with alcohol dependence are often immunodeficient and have an increased incidence of infectious diseases. Bacterial pneumonia, for example, is a leading cause of lower respiratory tract infection in this population.

With respect to heart disease, it seems that the effects of alcohol are both positive and negative. Epidemiological studies have found a preventive effect of regular light drinking (as little as a drink every second day), although the

finding remains controversial (*14, 15*), and appears to be confined to males over the age of 45 years and females past menopause. However, heavy drinking bouts are associated with increased rates of heart attacks. Even in societies where heart disease is a very important cause of death, the overall number of lost years of life attributable to drinking outweighs the saved years attributable to protective effects.

2.5 Conclusions on mechanisms of harm

In reviewing alcohol's intoxicating, toxic and dependence-producing properties, the Committee concluded that alcohol: has toxic effects that can harm almost any system or organ of the body; can exacerbate pre-existing mental and physical disorders; can adversely interact with other prescribed and illicit drugs in the body; as an intoxicating substance, is associated with a wide range of types of injury, intentional and unintentional; and can produce a dependence syndrome, with an abuse liability comparable to that of other dependence-producing substances under international control.

3. Alcohol availability and consumption in the world

Alcohol beverages have been available throughout the world for centuries. From communally-produced traditional beverages to mass consumer branded products, alcohol takes many forms.

3.1 Alcohol production, distribution and promotion

Four main modes of production and distribution of alcoholic beverages can be identified (*16*): home or craft production of traditional beverages; industrial production of traditional beverages; local industrial production of cosmopolitan beverages; and globalized industrial production of cosmopolitan beverages. By "cosmopolitan beverages" is meant European-style beer, wine, and brandy, whiskey, gin, vodka and other distilled spirits distributed far and wide — in many cases, globally. All alcoholic beverages were originally local, and marketers regularly aim to add new drinks to the "cosmopolitan" category, which might now be counted as including tequila, sake, cider and premixed spirits-based drinks, sold through global production and distribution channels.

Home and craft production remains an important part of alcoholic beverage production in many low-income countries. There is a wide variety of fermented and distilled beverages which are traditionally produced at the local level, for example in villages and in homes. On the one hand, traditionally-produced fermented beverages may potentially carry the benefits of having a lower alcohol content, providing local employment opportunities and preserving values of the local culture (which may or

may not promote lower levels of alcohol consumption). On the other hand, these traditional forms of alcohol are usually poorly monitored for quality and strength, and there are often health consequences related to harmful impurities and adulterants, particularly in distilled beverages, including multiple poisoning deaths in extreme cases.

Home and craft production is commonly outside the reach of state controls and taxation. The product is sold cheaply, and often to the poorer segments of society. When viewed from a public health and welfare perspective, it is important for the state to gain effective control and oversight over informal alcohol production and distribution. Licensing and inspection of production, whether it be a matter of cottage, of small factory or of full-scale industrial production, is an important means of eliminating adulterants, and facilitates the use of one of the most effective prevention measures, alcohol taxation. But gaining such control has often been a long process in the course of economic development and state-building; thus, for instance, it took a century for France to bring home distillation by farmers under state control (*17*). Informally or illegally produced alcohol, often produced on an industrial scale, accounts for a substantial part of the alcohol supply in many parts of the world, particularly in Africa, Asia and eastern Europe. A rough indication of its proportion of total alcohol consumption is the 27% of world alcohol consumption which is estimated to be unrecorded in official statistics.

At the other end of the production and distribution spectrum is the global production and distribution of branded beverages. As consumers in a low-income country move into a cash economy and have a little money in their pockets, the likelihood of using branded products, which use the latest developments in marketing technology, tends to increase. The production of these cosmopolitan beverages is increasingly concentrated in a small number of multinational companies.

In terms of public health, branded products sold and distributed by large enterprises have some advantages. On the one hand, taxes will usually be paid, and the purity of the product can be more easily assured. On the other hand, the trend towards concentration in the market also poses problems. Multinational enterprises will spend substantial resources on ensuring the fewest restrictions possible on their commercial interests. At multiple levels of government, and in international organization and trade agreements, the results of such representational activities are often counter to the public health interest.

A particularly problematic aspect of the growth of branded beverages in the global market is the transfer and adaptation across borders of intensive methods of advertising and promotion of alcoholic beverages. In many high-income countries alcoholic beverages are among the most heavily

advertised of commodities. Six alcoholic-beverage producers are among the world's 100 largest advertisers globally (*18*). This is counting only "above-the-line" expenditures on advertising in measured media. Alcohol beverage firms have also invested heavily in other forms of promotion, such as sponsorship of sporting teams and events, youth-oriented music concerts and festivals, and fashion shows and carnivals, and more recently the use of new technologies such as the Internet. The promotional campaigns for alcoholic beverages often seek out media and activities such as sports and rock music particularly attractive to young people, as the potential best customers for the product.

3.2 Levels, patterns and trends in alcohol consumption

The Committee noted with satisfaction the substantial advances in recent years in information on the amount and patterns of alcohol consumption on a global basis, in considerable part because of WHO's Global Alcohol Database and Global Status Reports on Alcohol, and activities connected with the Comparative Risk Analysis for alcohol, discussed below. High priority should be given to updating and extending the Global Alcohol Database, and to ensuring that the Food and Agriculture Organization of the United Nations (FAO) continues to collect data used in the Database. The Committee recommends that WHO set up a system of annual reporting of the alcohol situation in each Member State, whereby each country would report to WHO on alcohol consumption (recorded and unrecorded), on patterns of drinking and of abstinence in subgroups of the population, and on the prevalence of different alcohol-related problems.

The Committee reviewed in summary form the global data currently available on amount and patterns of alcohol consumption (see Table 1). Levels of alcohol consumption are conventionally reported in terms of annual per capita consumption — usually per inhabitant aged 15 years or more — in litres of pure (100%) alcohol. There are three principal sources of data for these estimates: national government data; data from FAO; and data from the alcohol industry. Where available, the best and most reliable data generally stem from national governments, usually based on sales figures, tax revenue or production data. However, these estimates usually do not incorporate unrecorded alcohol consumption, which may take many forms, including travellers' imports, smuggling, local unregistered production, and consumption of products containing alcohol but not intended for human consumption. Estimates of unrecorded consumption may draw on a variety of sources, but are primarily based on FAO data on crops used for alcoholic beverage production, and on population surveys specifically oriented to measuring flows and consumption of unrecorded alcohol. Variations in unrecorded alcohol consumption, both between and within countries over time, may indicate differences and changes in per capita consumption and in drinking patterns not otherwise

revealed by changes in recorded consumption. Documentation of unrecorded alcohol consumption is therefore of importance in alcohol policy studies, and especially in studying the links between alcohol policy, alcohol consumption and alcohol-related problems.

Table 1

Economic development status and alcohol consumption parameters in 2002 (based on population weighted averages of 182 countries)

	Level of mortality and category of countries	Average GDP PPP in I$[a]	WHO regions[b]	Adult recorded consumption in litre/year[c]	Adult unrecorded consumption in litre/year[c]	Adult total consumption in litre/year[c]	Drinkers (%)		Consumption per drinker in g/day pure alcohol	Average pattern of drinking[d]
							Males	Females		
Developing countries	High mortality	2 441	EMR-D, SEAR-D	0.3	1.4	1.7	19	2	33	2.9
	Very high or high mortality	2 249	AFR-D, AFR-E, AMR-D	4.4	2.6	7.1	47	32	41	3.0
	Low mortality	5 257	AMR-B, EMR-B, SEAR-B, WPR-B	4.4	1.3	5.7	67	36	25	2.5
Developed countries	Very low mortality	28 405	AMR-A, EUR-A, WPR-A	9.4	1.3	10.7	81	65	32	1.8
	Low child and low or high adult mortality	6 862	EUR-B, EUR-C	7.0	4.6	11.7	77	59	37	3.5
World (population weighted from regions)				**4.4**	**1.7**	**6.2**	**55**	**34**	**30**	**2.6**

AFR-D, AFR-E: low-income countries in the African Region; AMR-A: high-income countries in the Region of the Americas; AMR-B: middle-income countries in the Region of the Americas; AMR-D: low income countries in the Region of the Americas; EMR-B: middle-income countries in the Eastern Mediterranean Region; EMR-D: low-income countries with total ban on alcohol use in the Eastern Mediterranean Region; EUR-A: high-income countries in the European Region; EUR-B, EUR-C: middle-income countries in the European Region; SEAR-B: middle-income countries in the South-East Asia Region; SEAR-D: low-income countries with total ban on alcohol use in the South-East Asia Region; WPR-A: high-income countries in the Western Pacific Region; WPR-B: middle-income countries in the Western Pacific Region.

[a] Gross domestic product (GDP), a measure of the size of a country's economy; purchasing power parity (PPP) per capita, the country's per capita purchasing power for an equivalent basket of goods, expressed in international dollars (I$).

[b] The regional subgroups used were defined by WHO on the basis of high, medium or low levels of adult and of infant mortality. A, very low child and very low adult mortality; B, low child and low adult mortality; C, low child and high adult mortality; D, high child and high adult mortality; E, very high child and very high adult mortality.

[c] Consumption in litres of pure alcohol per resident aged 15 years and older per year (average of available data for 2001 to 2003).

[d] Indicator of the hazard per litre of alcohol consumed (1 = least detrimental; 4 = most detrimental), composed of several indicators of heavy drinking occasions plus the frequency of drinking with meals (reverse scored) and in public places.

Source: WHO and the World Bank

The prevalence of abstention, of different categories of average volume of alcohol consumption, and of different drinking patterns, such as intoxicated or binge drinking, are assessed by population surveys. The survey data also allow estimates to made by sex and age, and for other population subgroupings. Along with key expert interviews, surveys are also a primary source of data on the extent to which hazardous drinking patterns predominate among drinkers in each country and world region (see average pattern of drinking: last column in Table 1). As discussed above, intoxication can impact on certain categories of harm such as ischaemic heart disease or injuries, affecting the level of harm associated with a given overall level of drinking (*19*).

An overview of current data on the global extent and distribution of alcohol consumption is given in Table 1. For this purpose, the world is divided into five categories, based on the WHO subregions (*20*), but with some divisions made specifically for an alcohol analysis. In forming the WHO subregions, countries within WHO regions were assigned to one of five categories, A to E, on the basis of the health status of the population, with A countries showing the lowest infant mortality and the highest adult life expectancy, and E countries the highest infant mortality and lowest adult life expectancy. This health-based ordering corresponds roughly to levels of economic development. The top two rows in the table reflect a subdivision of the poorer developing countries on the basis of levels of alcohol consumption per adult, with the first row including the subregions with the lowest alcohol consumption. The third row is primarily composed of middle-income countries doing well in terms of economic development. In the fourth and fifth rows, the developed regions of the world are split, with the countries of eastern Europe and central Asia made into a separate category.

Globally, less than one half of the adult population (about two billion people) uses alcohol. Abstention rates are higher among females (66%) than among males (45%). The ranking by percentage of drinkers generally follows the ranking in terms of per capita purchasing power parity (PPP), a comparable index valued in a transformation of United States dollars. In Table 1, the two low-income categories (first and second rows) each have less than half the purchasing power per capita of the next highest category. The developed countries where mortality is very low (fourth row in table) have over four times the purchasing power of developing countries where mortality is low. In between are the middle-income countries and the category of countries in eastern Europe and central Asia. The table shows that across regions of the world there are more drinkers in richer regions of the world than in poorer. This does not hold true for the two lowest-income groups, which were separated on the basis of their rates of abstention: the subregions with the highest abstention rates are not quite as poor as the second category

of countries in the table. Generally, the sex differences in abstention are much greater in the three developing-country regional groups than in the two developed regional groups; the two developed regional groups have relatively high drinking rates in both sexes. At the level of the individual country (results not shown), the relationship between economic level and alcohol abstention rate is relatively close up to a level of PPP-adjusted gross domestic product of US$ 7000. Beyond a PPP of US$ 7000, there is little relation between the degree of affluence of the country and the adult rate of abstention.

The penultimate column in Table 1 on "consumption per drinker" shows that most of the difference between regional groupings in per capita consumption was in fact accounted for by the differences in rate of abstention. This suggests that if abstention rates decline with increasing affluence and exposure to global marketing, substantial rises can be expected in levels of consumption. In this context, the Committee concluded that there was an important public health interest in encouraging abstention and protecting the choice to abstain.

There is a wide variation around the global average of 6.2 litres of pure alcohol consumed per adult per year. The part of the world with the highest overall consumption level is eastern Europe and central Asia, with other areas of Europe also having high overall consumption. Recorded consumption is highest in the developed subregions with very low mortality (fourth row of table), but they have a relatively low level of unrecorded consumption, while the developed countries in eastern Europe and central Asia have by a considerable margin the highest level of unrecorded consumption. The result is that the two developed-region categories have estimated total consumption levels that are not far apart.

The Americas are the region with the next highest overall consumption, with richer countries in the Americas showing higher recorded consumption rates than poorer countries. The low-abstainer poorer subregions have the next highest estimated total consumption, followed by the low mortality developing countries. Most of Latin America and the Caribbean is included in these two categories. The high-abstainer poorer subregions show, as might be expected, much lower total consumption than elsewhere, with 98% of females and 81% males reporting being abstainers, and adult recorded consumption being 0.3 litre/year.

The average pattern of drinking score ranges from 1 for the least hazardous patterns to 4 for the most hazardous. The very low mortality developed countries have the lowest average hazardous drinking pattern score, while the eastern Europe and central Asian grouping has the highest. Lower-income developing countries, whatever their proportion of abstainers, also have relatively higher hazardous drinking pattern scores. Setting aside the

special case of eastern Europe and central Asia, it is generally true that the degree of hazard associated with each litre of alcohol consumed is higher in poorer than in richer countries. This implies that in general a rise in per capita consumption in a poorer country is likely to result in a greater increase in injuries and other intoxication-related harm than in a richer country.

Reviewing data on trends in consumption for the WHO regions, the Committee found that the European Region, the African Region and the Region of the Americas all reached their highest consumption at about the same time, in the early 1980s. The Eastern Mediterranean Region displays a steady low consumption. The two regions showing recent and continuing increases in consumption are the South-East Asia Region (starting from a low level) and the Western Pacific Region. However, the regional averages mask some quite marked differences in trends in individual countries. In Europe, for example, a rather steady level of consumption in recent years masks a substantial drop in consumption in some southern European countries, and a dramatic increase in some other countries.

There has been an increase in consumption in a number of low and middle-income countries in more recent years, particularly in the South-East Asia and the Western Pacific Regions. The consumption increase in these countries probably reflects economic development and increases in the consumers' purchasing power as well as increases in the marketing of branded alcoholic beverages.

3.3 Determinants and correlates of alcohol consumption

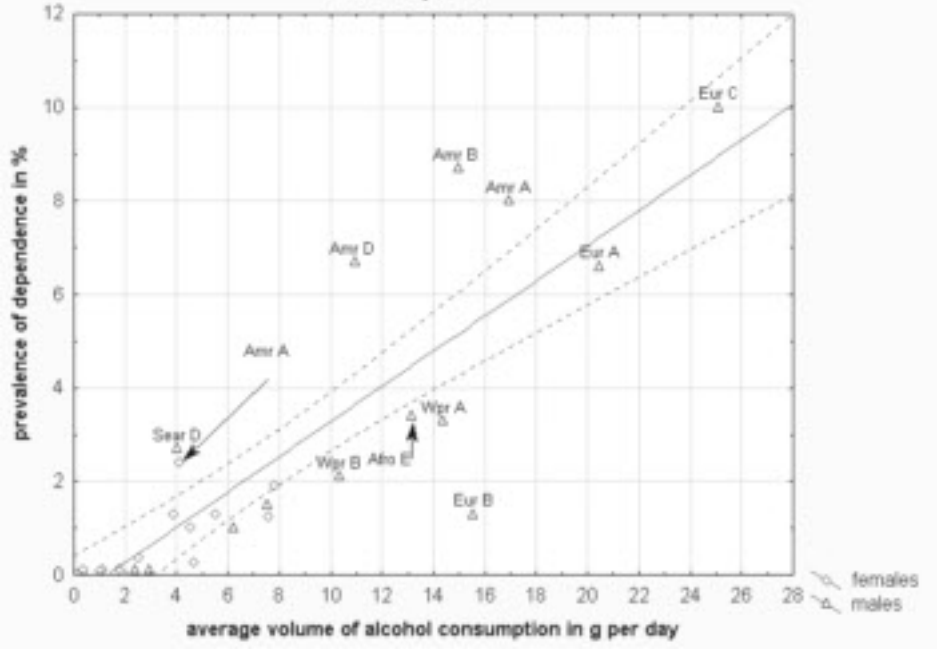
On a selective basis, the Committee considered some evidence on determinants and correlates of alcohol consumption. It noted that many cultural and social factors, including religious belief, affect abstention rates and the distribution of consumption in populations. On the one hand, within many societies, there is a strong relation between abstention and poverty. On the other hand, among those who drink, there seems to be a general tendency for hazardous drinking to be more predominant among poorer than richer drinkers. Commonly, a given pattern of heavy drinking by a poorer drinker is more likely to result in harm than the same pattern by a richer drinker.

Studies from a number of countries demonstrate that alcohol consumption is unevenly distributed across the drinking population; most of the alcohol in a society is drunk by a relatively small minority of drinkers. A typical finding is that half of the alcohol consumed is consumed by 10% of the drinkers. That there is often a strong connection between changes in the level of alcohol consumption in a population and changes in indicators of harm associated with heavy drinking (*21*) is thus partly tautologous, since heavy drinkers are responsible for a substantial part of the total consumption.

Partly for the same reason, there is often a strong cross-sectional relationship between levels of alcohol consumption and rates of alcohol-related harm in a population.

For instance, survey data from the World Mental Health Survey on the prevalence of alcohol dependence in different global subregions covaries to a considerable degree with the subregion's level of alcohol consumption per adult (Figure 1). About 75% of the variation in the prevalence of dependence can be predicted from the average volume of consumption at the regional level. The main deviation from the correlation is a systematic tendency for a higher rate of dependence to be reported for a given level of drinking in the Americas and in the region demographically dominated by India.

Figure 1: Alcohol dependence by average volume of alcohol consumption



Source: reference *22*.

Studies in different societies have in general found that, compared to women, men are less often abstainers, drink more frequently, drink larger quantities, and drink larger quantities per occasion, i.e. to intoxication. Hence, there are more heavy drinkers and more heavy drinking occasions among men, and consequently men predominate among harmful drinkers. Although the evidence is still sparse, it seems that this phenomenon may be even more distinctive in low-income countries. For instance, survey data from China indicate that around 95% of alcohol is consumed by men. At the same time,

one of the main social concerns in many societies is that women's drinking is increasing, particularly in low-income countries and noticeably among younger women.

Drinking habits in various age groups are difficult to compare across countries because different measures of drinking and age groupings have been used in population surveys. Moreover, most surveys that compare drinking in various age groups have been conducted in the established market economies of Australasia, Europe and North America, so the findings may not necessarily apply to other regions of the world. Nevertheless, a common picture emerges from these studies: abstinence or infrequent drinking are more prevalent in older age groups, and intoxication or heavy drinking episodes are more frequent among adolescents and young adults. Data from the European School Survey Project on Alcohol and Drugs in 29 countries indicate a tendency for an increase in patterns of risky drinking among European teenagers in recent years (*23*).

The Committee reviewed evidence of a strong co-occurrence of alcohol use with tobacco and other drug use among young people. There are multiple levels of connection between the behaviours — at physiological and psychological levels, in terms of shared pathways and synergistic or complementary effects, and at social levels in terms of symbolic meanings and overlapping subcultures of supply and use. The effects of alcohol intoxication on judgement and social inhibitions may also facilitate behaviour which when sober would be considered off-limits. In the Committee's view, there is no deterministic relationship between alcohol use and tobacco smoking or illegal drug use; the relationships are best described as probabilistic or stochastic, in that there is a greater likelihood of smoking or drug use among those who have started to drink, but many who drink alcohol do not get involved with smoking or other drugs, and some who smoke tobacco or use illegal drugs do not consume alcohol. Research has also addressed the question of whether reduction in alcohol use, as a result of effective policy implementation, leads to substitution by other drugs. While some research in the United States has suggested an increase in cannabis use among young adults following an increase in the legal drinking age, other research investigating the impact of changes of alcohol prices has found no substitution by other psychoactive drugs, such as cannabis, but rather changes moving in concert with alcohol use. Regardless of the direction of influences, the Committee considers that it is clear that in many cultural milieux there are strong connections between alcohol, tobacco and illicit use of drugs, which need to be taken into account in alcohol policies as well as in tobacco, medication and drug policies and research.

Studies of indigenous peoples throughout the world have often shown a significantly higher alcohol intake than that in the general population,

although there is considerable variation between groups. Rates of abstention are, however, often higher in indigenous minority groups than in the surrounding population. Apart from consumption levels, drinking patterns reported from various indigenous populations also tend to be more hazardous, with any drinking at all often implying drinking to intoxication. Increased access to and availability of commercial alcohol and a lack of health, education and other services to prevent and treat problems related to alcohol consumption, combined with already poor living and working conditions, have led to high morbidity and mortality from alcohol-related causes in indigenous communities. The Committee notes with interest the evidence of successful efforts by some indigenous communities to reduce rates of alcohol problems. These efforts often involve persuading the enveloping society to set aside usual market freedoms, and allow the community to restrict promotion and availability of alcoholic beverages (e.g. *24, 25*). The Committee suggests that WHO could play a substantial role in collating such experiences and disseminating them to other indigenous peoples.

3.4 Conclusions concerning alcohol availability and consumption

Alcoholic beverages are readily available in most parts of the world, alcohol production and marketing are increasingly global in scope, and advertising and other promotion to increase the market for the beverages is a growing and worrying presence on all inhabited continents. In the Committee's view, considering the public health implications of alcohol consumption discussed further below, it is important that WHO is actively involved in tracking and analysing these trends, and in representing the public health interest in international discussions and negotiations affecting trade and marketing of alcoholic beverages.

Globally, just over half the adult population does not drink alcohol, with abstention rates being higher in poorer countries and higher among poorer people within countries. Much of the variation in per capita consumption between countries, and between territories and populations within countries, reflects variations in abstention rates; there is less variation between world regions in consumption per drinker. However, rates of abstention have declined in many places, and further declines are predicted. In this circumstance, the promotion of measures to support personal choices to abstain from alcohol consumption should be considered by WHO.

The Committee concluded that alcohol consumption, and particularly hazardous drinking, was at the highest levels globally in eastern Europe and central Asia, followed by the Americas. In the coming years, alcohol consumption is likely to continue to increase substantially in the South-East Asia Region, and in the low to middle-income countries of the Western

Pacific Region (constituting nearly half of the world's population). The need for public health countermeasures that will involve both regional and global response is thus particularly urgent in these regions.

4. The harm attributable to alcohol consumption

As noted in sections 2.2–2.4 above, the evidence of alcohol's impact on health through its intoxicating, dependence-producing and toxic qualities is cumulative and extensive. In recent years, estimates of the burden of disease attributable to alcohol have become available through a series of WHO studies.

4.1 Impact on health: alcohol's contribution to the global burden of disease

The Committee reviewed the evidence of the overall net impact of alcohol consumption on the burden of disease for the year 2002, after estimated health-protective effects are subtracted (data on disease burden attributable to alcohol are summarized in the Annex). The Committee noted that alcohol is estimated to cause a net harm of 3.7% of all deaths, and 4.4% of the global burden of disease. Alcohol caused much more health burden for men than for women — the alcohol-attributable proportion of men's overall burden was about four times the proportion of women's. For deaths, unintentional injuries were the most important category, followed by cardiovascular diseases and cancers. With regard to the burden of disease expressed in disability-adjusted life years (DALYs) lost, neuropsychiatric disorders, mainly made up of alcohol use disorders, constitute the category with the highest alcohol-attributable burden, with unintentional injury being the second most important category. The difference in ranking for deaths and DALYs reflects that while alcohol use disorders are often very disabling, they are less often fatal than other disease categories.

Alcohol-related deaths increased for both men and women between 2000 and 2002. This increase is mainly attributable to chronic disease deaths, partly reflecting advances in the alcohol epidemiology and estimates of alcohol-attributable disease burden, although the relative impact of alcohol-attributable injuries decreased. The net impact of alcohol was relatively larger in younger age groups, again for both sexes. Whereas 3.7% of all deaths were attributable to alcohol in all age groups (6.1% in men; 1.1% in women), 5% of the deaths under the age of 60 years were attributable to alcohol (7.5% in men; 1.7% in women). There are large variations in alcohol-attributable disease burden between different regions of the world (Annex, Table A1.3). Injuries — intentional and unintentional — account for a higher proportion of the alcohol-caused burden of disease in lower-income countries, whereas alcohol use disorders and cancers account for

larger proportions of the burden in higher-income countries. The proportion of the alcohol burden accounted for by cardiovascular disease is highest in eastern Europe and central Asia and in the lower-drinking poorest parts of the world.

The Committee recognized that not all of the health conditions where alcohol has a causal impact could be included in the burden of disease estimates because of lack of data; this is especially relevant for communicable diseases. While biological-based risk relations, e.g. the relationship between alcohol consumption and breast cancer, may not be the same in all regions of the world (for example because of nutritional status or access to health care), the burden of disease study is based on meta-analyses of studies mainly coming from high-income countries of the world, and thus has probably underestimated the true impact of alcohol. Also, while risk relations are assumed to be constant for different age groups, relative risks tend to converge to unity with age, thus probably resulting in an overestimate of the impacts of alcohol, positive and negative, for the oldest age groups. Finally, death certificates and other death attributions are subject to more measurement error in older age groups. Since most of the estimated protective effects are in the elderly, the Committee considers that the protective effect is likely to have been overestimated.

There is a strong but not perfect relationship between a society's level of income and its general life expectancy. Findings are similar for alcohol consumption in that, for a given level or pattern of drinking, harm is greater in poorer societies than in more affluent societies. For chronic effects of heavy drinking such as liver cirrhosis, for instance, the Committee noted that there can be a worse outcome because of the existence of co-factors such as nutritional deficiencies or liver infections. Also, services to mitigate adverse health effects of drinking are likely to be less widely available. Drink-driving may have a worse outcome because of less safe streets and vehicles.

For a given amount or pattern of drinking, socioeconomic inequalities within a society are likely to have many of the same differential effects as those mentioned for differences between societies. Further, where there is unequal treatment or access to resources, the health and injury consequences of a given level or pattern of drinking are also likely to be more severe for those with less resources. Policies which reduce alcohol's contribution to the burden of disease are therefore also likely to reduce health inequalities more generally.

4.2 Social harms

Harms included in the global burden of disease (GBD) estimates are confined to physical and mental conditions included in the International Classification of Diseases. Acute and chronic mental and physical illness and injuries are

covered, but a wide variety of other adverse consequences of drinking are not covered. In particular, most adverse consequences for persons other than the drinker are not covered in the GBD estimates. We use "social harms" as a general term to cover these consequences, although we recognize that they would also be covered by the broad WHO definition of health as "a state of complete physical, mental and social well-being".

Important social harms which can be related to drinking include family and other interpersonal problems, work problems, violent and other crimes, and social marginalization. An individual's pattern of drinking can have adverse effects on his or her own life, disrupting his or her marriage and family life, causing loss of a job and unemployment, triggering commission of a crime resulting in arrest, or precipitating homelessness or other marginalization or stigmatization. The person's drinking can also affect others. The quality of life of family members may be adversely affected (*26*); workmates may be expected to fill in and cover for a worker absent with a hangover; and a drunken assault will have a victim. Apart from these interpersonal problems, the drinking may have adverse effects on larger social groups or the society. For instance, inferior job performance may affect a workplace's productivity; boisterous crowds of drunken youths may make a city centre a "no-go area" for older citizens on a weekend night. The adverse effects at a societal level may be easier to recognize in small societies. For instance, the social and religious rituals which bind together an aboriginal society may be disrupted and destroyed by recurrent drunkenness (*27*); there are many such accounts of the devastating effects of endemic intoxication on indigenous societies. In large and complex societies, there can also be serious effects at the collective level, though they are less easily recognized except in such rare circumstances as a sudden enforced change in drinking, for example a liquor store strike (*28*).

A primary locus for studying and quantifying the social harm from drinking has been the series of studies of the social cost of alcohol in what is called the "cost of illness" tradition. By now, over 30 such studies have been carried out just in Europe (*29*), and others elsewhere, with an increasingly standardized methodology in accordance with WHO guidelines (*30*). The biggest single cost estimated in such studies is usually for the "indirect cost" of premature mortality, a calculation of the loss to the future economy of what would have been produced by those with an alcohol-attributed death in the index year. Counting this indirect cost as a health cost, and considering it together with such direct costs as absenteeism, unemployment, damage from crime and traffic crashes, and the provision of health, criminal justice and social services to those affected by an alcohol-attributable problem, the costs of "social harms" typically outweigh the health costs (*29*). Focusing just on governmental costs of services in a developed society, the costs of policing, fire and social work services attributable to alcohol often far outweigh the costs of health services.

The Committee recognized that social costings have often included only tangible costs, and that the consequences of alcohol consumption include intangible costs as well, including human pain and suffering brought to a family by a member's drinking, and fear and suffering resulting from alcohol-related crime or violence. Such costs to family members are not yet well measured. Thus, a study of costs in England and Wales noted that, because of the lack of suitable studies, "it was not possible to quantify the intangible costs of pain and suffering to friends and family" (*31*).

There is growing evidence of alcohol's role in crime, and especially in different forms of violence (*32*), although this association varies considerably across countries and cultures. There is an overall relationship between greater alcohol use and criminal and domestic violence and child abuse. In general, in individual cases, the higher the level of alcohol consumption, the more serious is the violence.

Alcohol has also been linked to a number of other criminal behaviours, including violation of laws such as driving under the influence. There is also a link to public disorder, but the strength of this relationship again is dependent on culture.

Some of the harm from alcohol is tied up with the responses of others. In almost every society, drinking behaviour is to a greater or lesser degree moralized, sometimes with positive values attached to some drinking patterns or customs, but always with negative values attached to some patterns. Where use of alcohol is religiously or culturally forbidden, the negative valuation will be attached to any drinking of alcohol at all.

The Committee thus found that an individual's pattern of drinking is a subject of social evaluation in terms of approval or disapproval in everyday life. Patterns of drinking, particularly through the social evaluations of them, thus become involved in the creation of social inequality — an inequality which is not so much about socioeconomic status directly, but rather has to do with marginalization, social exclusion and stigma. A low socioeconomic status may also render a pattern of drinking more visible and make the drinker more vulnerable to marginalization and stigma. More positive evaluations of drinking can also have negative impacts on public health by making it more difficult to maintain abstention or provide adequate protection for younger people against exposure to alcohol.

The Committee considered that there is a clear tendency for many cultures to marginalize particularly those who are both poor and habitually intoxicated, and that there are many pathways by which poverty can enable or exacerbate the stigmatization of intoxication. Police surveillance of public drunkenness is often heightened in poor communities. Poor people, because of their lack of resources, are often less able to avoid adverse social consequences of

their drinking; the more affluent can purchase social or spatial buffering of their behaviour. The social reactions to what is defined as out-of-bounds behaviour may contribute to poverty: the drinker may lose his or her job, or be thrown out of an educational course. The end result, perhaps particularly in affluent societies, is that there is a very strong overlap between the most marginalized population and those defined as having serious alcohol problems.

The marginalization and stigmatization of heavy drinking can be seen as part of a society's attempts to control and if possible reduce the objective social harms from alcohol. However, as noted, this means of control often itself causes further harm; efforts at social control through stigmatization may result in further marginalization. The Committee suggested that WHO stimulate further studies in this area, with particular attention to differences between alcohol policies in the extent to which they stigmatize, and to how reduction of stigmatization can be taken into account in alcohol policies.

4.3 Conclusions on harm attributable to alcohol consumption

In reviewing the evidence of the harm attributable to alcohol, the Committee concluded that harmful use of alcohol has immediate and long-term effects impinging on every aspect of life, with alcohol intoxication impairing personal safety through its association with violence and other injuries, alcohol dependence as a substantial risk of regular heavy drinking, and toxic effects of alcohol potentially affecting all organs and systems of the body. The burden attributable to alcohol consumption occurs particularly in youth and young adulthood, and affects more men than women. The Committee emphasized the extent to which significant and important social and health harms to people other than the drinker (i.e. to third parties) are caused by alcohol consumption.

Substantial progress has been made in estimating, on a global basis, the harms to health from drinking. The Committee identified four areas of priority for further work: (i) the development of measurements of alcohol's role in social harms; (ii) overlapping with this, the measurement of harms from drinking to third parties; (iii) epidemiological studies of alcohol's contribution to infectious disease morbidity and mortality; and (iv) implementation on a routine basis in health emergency services of measurement of alcohol involvement in injuries.

The Committee considers that there is a need to set up a monitoring system, building on the solid base of WHO's recent work, to track rates, correlates and trends for alcohol-related health problems, with annual reports from Member States. Such a monitoring system, in the Committee's view, would provide important information for alcohol policy-making in Member States and internationally.

The measurement of social harm from drinking remains underdeveloped, and the pain and suffering associated with many forms of social harm mean that these harms are within the scope of WHO's concerns under its definition of health. The Committee identified measurement and monitoring of social harms from alcohol as an area which merited concentrated international attention, and emphasized that WHO can provide leadership in this.

The Committee concluded that, in general, poor people suffer a disproportionate burden of harm attributable to alcohol. In this circumstance, public health action to reduce drinking and associated harms also serves the interest of reducing health disparities between richer and poorer individuals and populations.

5. Effective strategies and interventions to reduce alcohol-related harm

Since the previous report of the Expert Committee on Problems Related to Alcohol Consumption, a substantial international literature has accumulated on the impact of diverse alcohol policies and measures. The Committee, while noting the substantial step that has been taken forward with studies examining the cost–effectiveness of different strategies *(*e.g. *33)*, took the evidence on effectiveness as its primary guide, since the cost–effectiveness studies are not yet well enough established or replicated to be a reliable guide. In general, though, the Committee found strong agreement between the cost–effectiveness studies and its conclusions based on the effectiveness literature.

While much of the evaluation literature to establish the effectiveness of these policies has been carried out in high-income countries, some measures have been evaluated in the context of low-income societies. Taking into account the fact that the evidence often stems from a narrow range of societies, the Committee considered the applicability of the research findings in low-income societies.

The Committee emphasized that the form of implementation of an effective measure needs to be appropriate for a particular society. Here the research literature is often of little utility, and the Committee stressed that practical experience in places which have implemented the measure needs to be collected, collated and disseminated. Community actions to address alcohol problems are of special importance, particularly in settings where unrecorded consumption is high. It is certainly not sufficient to pass a law without means of implementation, and the development of an inventory of practical experience in implementation in different societal circumstances is an urgent need.

The Committee's deliberation on the range of alcohol policies is organized mostly in terms of the major subdivisions in the evaluation literature.

These divisions partly reflect the different government departments, social institutions and professions involved, but also involve different theories of action of the policy intervention. For instance, drink-driving countermeasures, like criminal law and much administrative law in general, are premised particularly on a general (primary) deterrence effect. As a public health strategy, taxes on alcoholic beverages are premised on influencing consumer demand by increasing the cost relative to alternative spending choices. Alcohol education is premised on the model that knowledge will change behaviour. The fact that there is a theory of action underlying each set of policy strategies, and that these theories of action are widely held across societies in the relevant social institutions and professions, gives some assurance that findings from one society will have applicability in another, although the applicability is undoubtedly influenced by the specific context of a particular society.

5.1 Measures to reduce the availability of alcohol

There is wide experience of government controls on the production, distribution and sales of alcoholic beverages. One means for a government to exercise control is through monopolizing the activity itself. There is a rich history of such monopolies of production, wholesaling or retailing in the past 150 years, in both high- and low-income countries. In a number of countries, public ownership and operation of one or another part of the alcohol market continues today, although trade agreements and structural adjustment requirements have overturned many such systems.

A common alternative to government operation has been regulation of the operation of private interests in the alcohol market. Usually, these regulations have been premised on a system of licensing of the private operators — licenses which can be suspended or withdrawn. This means that the controls are enforced by administrative measures on those involved in these activities, backed up as necessary by criminal law. Such means of implementation are more effective and cost effective for governments than enforcement on customers or consumers.

While control of the production or wholesale levels is most important in maximizing the extent to which alcoholic beverages move through legal sales channels, the Committee recognized the particular importance of control at the retail level — both of sales in bars and restaurants for consumption on site, and sales of bottles or cans for consumption off site — for minimizing health and social harms from drinking.

The Committee reviewed evidence which has shown that alcohol retail monopolies are effective in holding down rates of alcohol-related harm (*34*). Important mechanisms for this are that such systems tend to have fewer stores, which are open for shorter hours than systems of private sellers.

The government's operation of such systems also replaces the private interests which would otherwise act as a pressure group to reduce controls on alcohol sales. In view of their effectiveness for public health purposes, the Committee considered that effort should be devoted to keeping these systems in operation, and indeed to extending their reach.

In general, the number of alcohol outlets is related to the level of alcohol consumption; consumption tends to increase when the number of outlets increases. The relationship seems strongest when there is a major change in number or types of such outlets. It also seems that there are special problems when outlets are tightly clustered, with a particular relationship between outlet density and the extent of underage drinking (see *29*).

As well as number of outlets, the hours and days of sale are frequently regulated. The Committee took note of the evidence that while extending times of sale can redistribute the times when many alcohol-related incidents occur, such extensions generally do not reduce rates of violent incidents and often lead to an overall increase in consumption and problems. In general, reducing the hours or days of sale of alcohol beverages results in fewer alcohol-related problems, including homicides and assaults (*34*).

The Committee considered that limits on availability can be reasonably cost effective; in most circumstances, a licensing system and the associated regulatory enforcement being funded with license fees. The restrictions on availability may create an opportunity for a parallel illicit market, for instance after-hours "bootleggers". But, in the absence of substantial home or grey-market production, in most circumstances such side-effects can be kept within bounds with modest enforcement efforts. Where a large grey or black market exists, of course, license-enforced restrictions may increase the competitiveness of the alternate market, and this factor will need to be taken into account in policy-making.

5.2 Alcohol price and taxes

The Committee reviewed evidence which indicates that, in general, the way drinkers respond to changes in the price of alcohol is similar to their response to price changes in other consumer products. When other factors are held constant, a rise in alcohol prices leads to a drop in consumption and less alcohol-related harm. Demand for alcohol has been found in many high-income countries to be relatively inelastic to price, like many other consumer goods — that is, a change in price results in a drop in consumption, but one that is relatively smaller than the increase in price. This means that while increasing alcohol taxes can be used as a strategy to reduce consumption and harm, government revenue from the taxes will actually rise in most countries. The limited data available from low- and middle-income countries show a similar pattern in the relationship between price and total

consumption as in high-income countries, particularly as their economies grow and as personal incomes increase. The existence of a substantial grey or black market for alcohol complicates policy considerations on alcohol taxes; in such circumstances, it may be advisable to accompany tax changes with efforts to bring the black or grey market under effective government control.

The Committee found that the price elasticity for different beverages, for different countries and over time is not uniform. Comparisons of beer, spirits and wine price elasticity have found it to be lower for the beverage generally preferred in a particular culture or market than for less-preferred alcoholic beverage types. The way drinkers respond to and compensate for price changes is complex, because of the possibilities for substitution (*35*). Consumers tend to shift to more expensive beverages if relative prices decrease, either within the same beverage category or across beverage categories. If prices are raised, they reduce overall consumption but also shift to cheaper beverages. Heavy drinkers tend to buy the cheaper products within their preferred beverage category. Studies of price elasticity also show a variation over time in consumer responses to a price change. The impact of an increase in alcohol price may be stronger in the longer term than it is in its immediate effects. From a public policy perspective, it is the long-term effects that are more important.

The evidence shows that young people's consumption is particularly sensitive to price (*36*). Policies that increase alcohol prices have been shown to reduce the proportion of young people who are heavy drinkers, to reduce underage drinking, and to reduce per occasion binge drinking. Higher prices also delay intentions among younger teenagers to start drinking and slow progression towards drinking larger amounts.

While heavy drinkers are sometimes thought to be likely to be less affected by price, the Committee found that the evidence does not support this belief, with higher prices affecting the amounts consumed by frequent and heavy drinkers. This finding is supported by a large body of evidence which has shown an impact of prices on harms caused by alcohol, also indicating therefore that heavier drinking has been reduced (*34*). Natural experiments that have occurred recently in Europe as part of changes required as consequences of economic treaties have shown that as alcohol taxes and prices have been lowered, so sales and alcohol consumption have increased (*37*). In some jurisdictions in Europe, special taxes have been introduced for spirit-based sweet premixed drinks, in response to increases in young people's drinking (*38*). These have led to reductions in sales and consumption of the specific drinks.

The Committee viewed alcohol taxes as being a highly cost-effective strategy for reducing rates of alcohol-related problems and as a strategy

that can be justified on the grounds of recouping the costs associated with alcohol-related harm. Particularly in countries with high levels of hazardous drinking, taxation is likely to be a more cost-effective means of reducing alcohol-related problems than other alcohol policies. Tax changes, while still being effective, may not be the first choice of policy in countries with lower levels of problems, where interventions directed at particular subpopulations may be more cost effective. However, even in such countries, downward shifts in alcohol prices or increase in disposable income could undermine these other policies.

The effect of alcohol tax increases could be reduced by illegal production, tax evasion and illegal trading, smuggling and cross-border purchases. Where there are neighbouring countries with substantially lower taxes and porous borders, this will need to be taken into account in governments' decisions about tax policies. In such situations, there is a strong argument for adopting a rule of international comity, whereby countries recognize and discourage evasion of each others' alcohol policies.

The Committee thus concluded that taxation and pricing are important mechanisms for reducing demand for alcohol beverages and levels of alcohol-related problems.

5.3 Restricting the sale of alcohol

While total bans on the sale of alcohol are present in several countries with majority Muslim populations, as well as at the community level in indigenous communities in a number of countries, there are also other widely dispersed bans for particular locations, circumstances or statuses. For instance, bans on drinking in parks or streets, as a way of improving the amenities for local families and residents, can be found in many countries. Bans on drinking in particular circumstances, for instance while working, are commonplace.

A minimum age for purchasing or drinking alcohol is, in fact, one of the most widely distributed alcohol control measures. There is very substantial evidence of the effects of laws which set minimum ages for the purchase of alcohol, showing, for example, clear reductions in drinking-driving casualties and on a variety of other indicators (*34*). Minimum ages of purchase affect both the frequency and the circumstances of drinking, although they seem to have less influence on the age of drinking initiation.

The Committee, however, stressed that the effectiveness of underage sales bans depends considerably on the degree to which restrictions are enforced, with the most cost-effective means of enforcement being on sellers, who have a vested interest in keeping their business record clean and retaining the right to sell alcohol.

5.4 Regulation of the drinking context

The link between drinking and health or social harm is often mediated or affected by the physical or social context — both the context in which the drinking occurs, and succeeding contexts while the drinker is under the influence of alcohol. Modifying the relevant contexts so as to reduce the harm from drinking has thus been a commonly-used policy approach. A wide variety of modifications of public drinking contexts have been formally and informally applied at one time or another, including use of drinking glasses which cannot be used as a weapon, safety-oriented design of the premises, and the employment of security staff in part to reduce potential violence. The main emphasis has been on modifying the behaviour of those serving the alcohol and of door and security staff by various means. In earlier approaches, the emphasis tended to be on voluntary enlistment of establishments and staff. But it became apparent that the measures were likely to be effective only when backed up by formal "house" policies on the conduct of staff and, most importantly, by enforcement by police or liquor licence inspectors (*34*). When backed up by enforcement and house policies, "responsible server programmes", in which serving staff are trained to deny service to those who are already intoxicated or under age, have been shown in a few studies to be effective in reducing drink-driving or violence.

The Committee concluded that the problems potentially averted by modifying the drinking context — e.g. drink-driving and violence — often result in harm to others. This aspect gives the approaches substantial policy significance and attractiveness. But the Committee also concluded that there is no point in implementing such approaches if they are not backed up by credible enforcement, which requires adequate resources.

5.5 Restrictions on alcohol marketing

The Committee stressed the importance of alcohol marketing as a public health issue, and in particular the exposure of children and young people to commercial messages about alcoholic beverages and brands as an area of growing policy importance. While alcohol is marketed through increasingly sophisticated advertising in mainstream media, it is also promoted by linking alcohol brands to sports and cultural activities through sponsorships and product placements, and by direct marketing that uses new technologies such as the Internet, podcasting and mobile telephones.

Although earlier econometric studies of the link between alcohol advertising and consumption yielded mixed results, the Committee took note of the results of recent studies using sophisticated methods which found effects of alcohol advertising on behaviour (*39*). The strongest evidence came from several longitudinal studies of the impact of various forms of alcohol

marketing — looking at exposure to alcohol advertising in traditional media as well as promotion in the form of movie content and of alcohol-branded merchandise — which have all found small but significant effects on both whether young people drink and whether they were heavier drinkers (*40, 41*). Furthermore, the effects of exposure seem cumulative and, in markets with greater availability of alcohol advertising, young people were more likely to continue to increase their drinking as they moved into their mid-twenties, while drinking declined earlier in those who were less exposed. These findings of the impact that advertising can have on young people's behaviour are in keeping with research on young people's smoking and children's food preferences (*42, 43*).

In some jurisdictions there is a reliance on "self-regulation" — voluntary systems implemented by the industries involved in alcohol marketing (including advertising, media and alcohol producers), and these are being promoted as the most appropriate approach (*44*). The Committee considered that these voluntary systems do not prevent the kind of marketing which has an impact on younger people and that self-regulation seems to work only to the extent that there is a current and credible threat of regulation by government (*45*). The Committee concluded that unless industry processes related to alcohol advertising standards come under a legal framework, and are monitored and reviewed by a government agency, governments may find that allowing self-regulation by industry results in loss of policy control of the marketing of a product that seriously affects public health.

5.6 Drink-driving countermeasures

The measures to reduce casualties from drink-driving are among the most heavily researched strategies to reduce alcohol-related problems. It should be noted that several of the other strategies — e.g. minimum age laws and enforced server-training programmes — have also showed effectiveness in reducing drink-driving casualties, and thus might also be considered drink-driving countermeasures. Conversely, it should be recognized that in many low-income societies injuries to intoxicated pedestrians are more common than driver and passenger injuries, so that even the most effective drink-driving countermeasures may not address a substantial part of alcohol-related traffic injuries.

Establishing a maximum blood alcohol concentration (BAC) for driving is a well-established and widely diffused drink-driving countermeasure. Over the years, the level specified as maximum has been lowered in a number of countries, and is as low as zero or 0.02 g/100 ml in a number of countries, and 0.05 g/100 ml or lower in most countries in Europe. There is convincing evidence that, at least in high-income societies, both establishing a BAC and lowering it are effective in reducing drink-driving casualties. There is

also convincing evidence that both intensive random breath testing, where police regularly stop drivers on a random basis to check their BAC, and sobriety checkpoints, where all cars are stopped and drivers suspected of drink-driving are breath-tested, reduce alcohol-related injuries and fatalities. Other effective measures were also noted by the Committee: setting lower BACs (including a zero level) for young or novice drivers; administrative suspension of the driver's licence for a driver caught with a positive BAC (particularly in legal systems in which a criminal drink-driving case may be delayed or successfully fought by a defence lawyer); and for repeat drink drivers mandatory treatment and the use of an ignition interlock, a mechanical device which does not allow a car to be driven by a driver with a BAC above a low level.

A number of high-income societies, implementing effective countermeasures over a period of time, have been able to dramatically reduce rates of casualties from drink-driving (*46*). The implementation of a variety of countermeasures in itself reflects that there has been a high public and political will to adopt quite intrusive countermeasures. Conversely, a typical experience is that the adoption of the measure in itself strengthens the public will. The Committee viewed the history of drink-driving countermeasures as potentially offering some lessons for the progressive implementation of other strategies to reduce rates of alcohol-related problems.

5.7 Education and persuasion

A variety of approaches to the education and persuasion of people about alcohol have been used with the intention of reducing alcohol-related harm, including: education of younger people in classroom settings; information campaigns using mass media, including more recently the use of interactive Internet sites, and the promulgation of drinking guidelines; labelling of alcoholic beverage products with the content in terms of standard drinks and with warnings; school-based activity carried out as part of school plus family initiatives and as part of community action projects; and community initiatives aimed to challenge norms around alcohol consumption and distribution.

The Committee considered that while provision of information and persuasion is perennially attractive as an intervention to reduce alcohol-related harm, particularly in relation to younger people, theory and evidence would suggest that this is unlikely to achieve sustained behavioural change, particularly in an environment in which many competing messages are received in the form of marketing material and social norms supporting drinking, and in which alcohol is readily accessible.

The Committee noted the results of a number of careful systematic reviews that have been published of evaluations of school-based education which

aimed to reduce alcohol-related harm (e.g. *47*), and concluded that the results have not provided support for classroom-based education as an effective intervention to reduce alcohol-related harm. Although there is evidence of positive effects on increased knowledge about alcohol and in improved attitudes, there is no evidence for a sustained effect on behaviour.

The Committee found that, in general, public information campaigns are an ineffective antidote to the high quality, pro-drinking messages that appear far more frequently in the media. The Committee also found that counter-advertising, a variant of public information campaigns which provides information about a product, its effects and the industry that promotes it, in order to decrease its appeal and use, had inconclusive effects. The Committee nevertheless noted that there was some evidence for the impact of mass media campaigns to reduce drinking and driving, particularly in jurisdictions with strong policies in place concerning drinking and driving (*48*). While drinking guidelines have been promulgated in a number of countries, there have been no evaluations of whether these guidelines have any impact on alcohol-related harm.

Results of evaluation research on mandated health warnings on alcohol product containers do not demonstrate that exposure produces a change in drinking behaviour per se (*34*). It seems that some intervening variables are affected, such as intention to change drinking patterns (in relation to situations of heightened risk such as drink-driving), having conversations about drinking, and willingness to intervene with others who are seen as hazardous drinkers. The Committee noted that this finding contrasts with evidence from tobacco, where there is evidence of impact, but this may reflect the nature of the warning labels, since it seems that the introduction of more graphic and larger warnings for cigarettes, with rotating messages, has affected behaviour.

The Committee considered that there is some evidence to support combining school and community interventions, in part because the community interventions may be successful in restricting access to alcohol by young people (*34*). An important component of community action programmes, which has been shown to have an impact on young people's drinking and on alcohol-related harm such as traffic crashes and violence, is media advocacy. Media advocacy can educate the public and key stakeholders within the community, resulting in increased attention to alcohol on the political and public agenda. This can lead to reframing the solution to alcohol-related problems in terms of a coordinated approach by relevant sectors, such as health, enforcement, nongovernmental organizations and municipal authorities (*49*).

The Committee recognized that another approach to community action in low-income countries has been to encourage communities and mobilize public

opinion to address local determinants of increased alcohol consumption and problems. Examples of ways that communities may address such determinants include counteracting the attractiveness of the image of alcohol and drinking, reducing unfair privileges attached to alcohol use, improving recognition by everybody of the nature and magnitude of health and social consequences of harmful use of alcohol, recognizing and counteracting the influences that encourage increased alcohol consumption, encouraging quitting or reduction of use or change in patterns of consumption, as appropriate, and encouraging the implementation of effective policies, locally and beyond (*50*).

5.8 Early intervention and treatment services

The Committee viewed early intervention and treatment for people with alcohol use disorders as potentially fulfilling three goals: as a humanitarian approach to the alleviation of human suffering; as a method of reducing alcohol consumption and harm in the population; and as a way of reducing alcohol-related health-care costs. People who drink alcohol excessively place a disproportionate burden on health, social care and criminal justice systems compared to lighter drinkers or abstainers. They also contribute to a disproportionate amount of the more intangible costs of excessive drinking, including harm to families and problems in the workplace.

The Committee found that in most countries the population of persons seeking or in need of treatment is heterogeneous in terms of alcohol problem severity, and also in terms of co-occurring conditions such as physical and mental disorders. Hence the range of interventions necessary to serve the needs of this population is of necessity broad, ranging from brief interventions in primary care to more intensive treatment in specialized settings.

The Committee took note of the extensive evidence from a variety of health-care settings in different countries that showed the effectiveness and cost–effectiveness of opportunistic screening and brief interventions for persons with hazardous and harmful alcohol use in the absence of severe dependence (*51*). These evidence-based technologies have been widely disseminated throughout the world and are now being implemented and evaluated in demonstration programmes in both high- and low-income countries (*52*). The Committee commended the substantial role that WHO has played over many years in the international coordination of efforts to test and promote these interventions, through its sponsorship of the Project on Identification and Management of Alcohol-Related Problems (*53*). The Committee considered that if these programmes were widely adopted in national or regional health-care systems, the impact on excessive drinking at the population level could be significant. The

Committee also recognized that implementation of such programmes was not a trivial matter, and that further demonstration is needed of effective implementation approaches (*54*).

The Committee found that for people with more severe alcohol dependence and related problems, a wide variety of specialized treatment approaches have been evaluated, including behavioural, psychosocial and pharmacological interventions of varying intensities, in both community and residential settings. The Committee also noted the evidence that individuals exposed to these treatments, especially when the treatments were delivered in a timely manner, achieved better outcomes than people not receiving treatment (*55*). Further, for the average person, the effectiveness of these treatments tended to be comparable regardless of intensity, modality or setting. However, the Committee concluded that individuals with more complex needs or limited community support will often require more intensive approaches (*56*). The Committee also emphasized the importance of adequate treatment policies, and the availability of non-stigmatized and confidential services for people with alcohol use disorders.

While there is evidence to suggest that investment in specialist treatments in countries with a high prevalence of alcohol problems may bring societal savings, in countries with low rates of alcohol use disorders in populations, brief interventions may be a more cost-effective approach. Mutual help organizations are widely available throughout the world and have been evaluated in a limited number of studies. The results suggest that there is an incremental effect when the services provided by mutual help organizations are combined with formal treatment, and such organizations may provide support for the maintenance of long-term sobriety (*57*).

5.9 Conclusions on effective strategies to reduce alcohol-related harm

There is now a substantial evidence base on the relative effectiveness of different strategies for reducing rates of alcohol-related harm. Unfortunately, much of the evidence derives from a particular set of high-income countries where alcohol problems are well recognized as a health and social issue and where there is a tradition of drawing on social and evaluation research as an input to policy. The Committee noted the importance of both of these dispositions and emphasized the need for the wide adoption of the principle that whenever there is change in an alcohol policy, some resources will be set aside for evaluating the effects.

Despite deficiencies, there is an adequate evidence base to sort out strategies in terms of their relative effectiveness. In general, research findings show that the conditions of alcohol supply — when and under what circumstances alcohol is available — can considerably affect rates of

alcohol-related problems. Specific alcohol control legislation and licensing systems have proved beneficial in a variety of sociocultural circumstances. Effective aspects of such systems include limits on density of outlets and on hours of sale. Prohibition on selling to a person under a minimum age for purchasing alcohol and to someone who is intoxicated are also common and potentially effective features. Effective enforcement of the system's rules is also important. High rates of taxation on alcoholic beverages have also proved effective as a strategy to control levels of alcohol-related problems. Whatever their other functions for the government, alcohol taxes should be considered as a public health issue, as a part of alcohol policy.

The Committee concluded that the evidence was also strong for a specific set of drink-driving countermeasures. These notably include setting a low blood alcohol level as a requirement for driving, and enforcing the limit actively with a programme of random breath-tests or equivalent measures.

The Committee concluded that assessment and brief intervention in the context of primary health services had proven effectiveness in reducing heavy drinking or alcohol-related problems in a variety of different sociocultural situations. The Committee suggested that a further development of this effort might focus on demonstration projects on how the strategy may be implemented in a continuing fashion in different health systems. Finally, the Committee emphasized the need for adequate treatment policies to ensure access to evidence-based treatment interventions and community services for people with alcohol use disorders.

6. Making alcohol policy

The Committee viewed as a main goal of alcohol policy promoting public health and social well-being. In addition, policy can address market failures by deterring children from using alcohol, protecting people other than drinkers from the harm done by alcohol, and providing all consumers with information about the effects of alcohol. As governments increasingly turn their attention to health inequalities, the reduction of inequalities in alcohol-related ill-health becomes an additional policy goal.

The optimal levels of alcohol policy will depend on each society's particular goals and willingness to accept the different policy instruments. For example, any attempt to determine the optimal tax on alcohol depends on ascertaining the scale of the costs to all consumers and non-consumers, and the differing costs to consumers of different income levels. It also depends on particular societal values, such as the extent to which children should be protected, and the specific goal that the tax seeks to achieve, such as a specific gain in revenue or a specific reduction in alcohol-related disease burden.

Successful policies are likely to have certain common features. One is enabling policy-makers to gain "ownership" of the chosen interventions by providing them with the research findings on which the interventions are based. Clear objectives, management plans, sound information, and regular review are essential. Policies and programmes need to be sensitive to cultural values and the historical experiences of the country. Finally, a critical feature of successful programmes is their ability to engage the many different sectors of government that have an involvement with alcohol use and its harm.

6.1 Building a knowledge base for alcohol policy development

All policies and actions to improve public health need a firm knowledge base, and that research and evidence are among a society's most valuable and important tools for laying the foundation of better strategies to improve public health. The growing role of research means that the scientific community should be more involved in developing scientifically sound, socially relevant and feasible bases for alcohol policy decisions.

To contribute constructively to the policy debate, the scientific community needs to frame policy-relevant research questions in time for the data to be available when needed, to have carried out high quality research and to have interpreted and disseminated the data in ways that are relevant to the policy debate. This may also involve the re-presentation of information already available when its relevance rises again on the policy agenda. Such sustained contributions may be possible only in the context of a long-term publicly funded research programme designed to engage members of the scientific community in each country in the collection, evaluation and interpretation of research data relevant to a country's alcohol policy needs.

Responsibility for translating scientific research into effective policy is distributed across a wide variety of government agencies and public interest groups. In addition, there need to be systematic mechanisms for ensuring that new evidence from research is actually introduced into policy and programme practice. Further, there need to be mechanisms to identify gaps in evidence. Gaps should be filled with new research in areas where the knowledge base is insufficient, including increased assessment of the cost–effectiveness of interventions. Special efforts should be made to develop research for anticipating future trends, needs and challenges in alcohol policy.

6.2 Sectors and alcohol policy

The implementation of a national alcohol policy is inherently a cross-sectoral task. It is increasingly recognized that policies in many sectors other than health can impinge on the potential of harmful alcohol use.

Alcohol taxes can not only reduce the harm done by alcohol, but can also bring in extra government revenue. Taxes can be set at their maximum revenue potential, which is seldom achieved. The Committee noted that such taxes are an efficient source of revenue to fund publicly-provided, equity-enhancing programmes. In reviewing the evidence, the Committee took note of two general situations when an increase in alcohol taxes may not lead to an increase in revenue: where there is no effective control over the alcohol supply by the State, as it may have large effects on the scale of alcohol tax evasion; and where alcohol consumption is unusually sensitive to price, although this is not found in normal situations even in high-tax countries.

Significant commercial interests are involved in promoting alcohol's manufacture, distribution, pricing and sale. Involved are not only producers and wholesalers, often relatively large enterprises, but also retailers who then sell alcoholic beverages through bars and restaurants, as well as other points of sale. The alcohol industry has become increasingly involved in the policy arena. In part, this has been through funding a network of national, regional and global "social aspects" organizations which sponsor selected prevention initiatives or industry-friendly views on alcohol problems and policies, and promote the concept of corporate social responsibility (*58*). The Committee cautioned that the private sector should not be trying to do the work of governments, which are properly the guardians of the public interest. However, the Committee considered that the alcohol industry has a particular role to play in the implementation of some specific alcohol policies and programmes. This can include providing server training to all involved in the alcohol sales chain to ensure responsibility in adhering to the law, and in reducing hazardous drinking, and in ensuring that alcohol is not available to those under the drinking age.

As a constituency with expertise in matters relevant to public health, health-care workers worldwide can take a leading role in reducing the harm done by alcohol, not only by integrating assessment and interventions for hazardous and harmful drinking into health care, but also by informed advocacy for alcohol policies. Those interested in public health should take a comprehensive "horizontal" view of the needs for alcohol policy across society as a whole, to analyse broad strategies, to create innovative networks for action among many different actors and, in general, to be a catalyst for change. In this regard, there is a need for public health interests to recognize the significance of mass media in the policy debate at the national and local levels. Media coverage of specific issues has an agenda-setting function — that is, it influences whether policy-makers perceive a problem and how salient that problem is seen to be. Media advocacy can also be used to support a shift in public opinion for policy changes.

The Committee viewed as important the role of nongovernmental organizations in alcohol policy consideration and action. As vital components of a modern civil society, nongovernmental organizations can raise people's awareness of issues and the related concerns, advocate change and create a dialogue on policy. Resource-scarce countries rely considerably on nongovernmental organizations and groups such as self-help and women's groups for dealing with alcohol-related problems. The Committee emphasized the importance of the participation of civil society organizations without conflict of interests in alcohol policy development, as a counter-influence to the vested trade interests, which might otherwise dominate political decision-making.

6.3 Alcohol policy at different jurisdictional levels

While alcohol policies have traditionally been a matter for country and sub-country levels, in recent decades this situation has in many ways been transformed. Along with greatly increased trade and travel have come much greater opportunities for the transfer of alcoholic beverages across national borders, whether as duty free or other legal imports or as smuggled goods. Transnational aspects of alcohol production and distribution have grown enormously, in terms of exports and imports, of rapidly consolidating multinational producers, of international licensing and co-production arrangements, and of multinational advertising agencies to promote the products. A further important factor has been the growth of supranational common markets and international trade agreements.

With respect to the national level, the Committee viewed it as ultimately a national government's responsibility to define and be accountable for a clear alcohol policy for the whole country. Policy systems at the national level are rarely dominated by one decision-making authority, but tend rather to be decentralized and delegated to a variety of different and sometimes competing decision-making entities, such as the health ministry, the transport authority or the taxation agency. Thus, effective and permanent coordination machinery needs to be established, such as a national alcohol council, comprising senior representatives of relevant ministries and other partners, to ensure that a coherent approach is taken to alcohol policies and that policy objectives are set and attained.

Implementation of national alcohol policies can be supported by action plans, not only at the national level, but also at sub-national and municipal levels, with clear objectives, strategies and targets, making use of laws, as well as of administrative, financial and management instruments. The Committee considered that an effective approach to alcohol policy requires all sectors of society to be accountable for the health impact of their policies and programmes. It noted that one method of financing

programmes to reduce the harm done by alcohol is an earmarked alcohol tax.

The Committee considered that implementing policy at the local level has a number of advantages. Local citizens are close to where alcohol-related problems are experienced personally. The community must deal with injuries and deaths from road traffic accidents. Often it must provide hospital and emergency medical services, and provide interventions for people with alcohol use disorders. Alcohol problems are personal experiences for community members, and efforts to prevent or reduce future problems are also a personal matter. However, a common experience has been that local alcohol policy-making is hampered by restrictions on local action imposed by national or regional authorities. It is important that local authorities have the means and power to act to reduce alcohol-related harm in their community to the lowest possible level. Evidence presented to the Committee demonstrated the impact of urban alcohol policy interventions in reducing violence and in increasing citizen safety (*e.g. 59*).

6.4 Conclusions with regard to making alcohol policy

The Committee concluded that when making alcohol policy, there are many competing interests, many different sectors involved, and a need for policy at many different levels. Alcohol policy is, in part, also influenced by strong symbolic and value-driven opinions, which often vary between societies. The Committee considered that although alcohol policy is a responsibility of government, this does not mean that government needs to fund and provide all interventions. However, the Committee concluded that a country's government, through its health ministry, should carry the main responsibility to ensure collective provision of effective governance for alcohol policy, primarily through an action plan with clear objectives, strategies and targets. Further, the Committee concluded that governments should be mindful of when alcohol policy is best implemented at the local and municipal level, when comity of countries in relation to alcohol policy should be respected, and when collective action at both the regional and global level is more appropriate.

The Committee concluded that rational policy-making on alcohol requires a consideration of the nature of the evidence, how the evidence may be used, and the ways in which policy decision-making actually occurs — the multidimensional nature of the responses and their dynamic interactions. Policies must also take account of economic and social conditions, of the powers and competence of different levels of government, and of the patterns of drinking as well as the nature and scope of alcohol-related harm in the particular society.

7. Implications for international action

Alcohol policies have traditionally been a matter for the national and sub-national levels. It is still true that most alcoholic beverages are consumed in the country of production. Government controls of the alcohol market are either national or, more often in federal countries, primarily a sub-national matter. Health and social systems for responding to alcohol problems are national or sub-national, and often in many respects are locally operated. In recent decades, exports and imports of alcoholic beverages have grown significantly, as well as the activities of multinational advertising agencies to promote them. Also there has been a substantial increase in international arrangements regarding production and distribution of alcoholic beverages.

7.1 International aspects of alcohol control

The growth of supranational common markets and international trade agreements results, in some jurisdictions, in eroding the position of freestanding national alcohol policies, and public health considerations are subordinated to the logic of the free market and free trade. Time after time, countries in one or another part of the world have been forced under such agreements to weaken or abandon important aspects of their alcohol policies, when alcohol in the context of such markets and agreements has been treated as a commodity like any other economic commodity (*60*). Policies dealing with alcohol must fit with the legal obligations made by States to each other, within a body of international treaties at global and regional levels that have built up since the end of the Second World War. These commitments reduce the scope for States to enact protectionist policies, but what this means for public health policy has generally been interpreted in two ways. Some commentators — in particular those from health or social science backgrounds — have expressed concerns about how trade rules (particularly on a global level) may constrain health or social policy within a trading system that prioritizes commercial goals above health (e.g. *61*). Others — mainly from business, governmental or economic spheres — have responded with confidence that governments are safe to pursue health aims as long as they follow the rules when doing so (e.g. *62*).

The Committee was reminded that the World Health Assembly recognized in May 2006 that international trade and trade agreements pose serious issues for public health interests more generally, and urged Member States to "address the potential challenges, that trade and trade agreements may have for health" (WHA59.26). The World Trade Organization (WTO) operates under its own supranational enforcement and dispute resolution framework. WTO rules are legally binding; that is, members are required to bring their inconsistent measures into conformity with WTO rules or face trade

sanctions until they do. Initially, trade treaties covered alcohol as a good, or commodity, like all others. More recently, trade treaties (particularly in the form of the General Agreement on Trade in Services) have been in the process of extension to cover also alcohol-related services and investment. In both cases, the coverage of alcohol is extensive, and the application of services and investment rules can have important public health consequences. Thus, alcohol-related services include: alcohol brewing and distilling; alcohol transportation; alcohol distribution; alcohol advertising; serving alcohol in restaurants; selling alcohol for consumption off-premises; and the treatment of alcohol problems. Modern trade treaties, such as the General Agreement on Trade in Services (GATS), define "investment" very broadly to include most types of direct and indirect ownership interests, intellectual property, and contracts, licences, authorizations, permits and other property rights — all of which can affect health-based alcohol policies.

Articles within WTO agreements state that nothing in such an agreement "shall be construed to prevent the adoption or enforcement by any contracting party of measures necessary to protect human health," as long as these measures are not a "disguised restriction on trade" or "unjustifiable discrimination" (*63*). This puts the burden on the country defending a health policy to show that there is no "less trade restrictive" alternative that would have the same effect, and that the policy is being used in good faith. Where a disputed measure is ruled to be very important for an aim such as health, it will be maintained by WTO even if it is severely disruptive to trade. However, the burdens of this "necessity test" can be substantial and difficult — which could mean that the defence is not enough to protect health policies in practice. In fact, defences of a national law under general exceptions have been successful only twice in the half-century of GATT and WTO decisions (*64*).

The Committee recognized the potential benefit of already existing mechanisms in which alcohol and tobacco are excluded from trade agreements, such as the Pacific Island Countries Trade Agreement and economic treaties in the Commonwealth of Independent States. The Committee also noted that, for several treaty commitments within the European Union, restrictions of free trade can be defended on health grounds, on similar terms to those under WTO. As with WTO, though, these restrictions must be determined to be proportionate responses; that is, they cannot go beyond what is necessary to fulfil their aim. This is particularly important for advertising regulations, which have been seen to reduce the ability of foreign firms, compared to established ones, to successfully enter a market, and thus to have a protectionist effect. Yet, in three cases, the Committee noted, the European courts have unambiguously supported advertising bans, including upholding the French ban on alcohol advertising in "bi-national broadcasts".

Alcohol is the only major dependence-producing psychoactive substance causing substantial health harms which is widely used worldwide and at present not covered by one or another international treaty. In the Committee's view, there is a need for the public health community to consider the various options which exist for strengthening action on alcohol policy at the international level. The Committee noted the following options for a potential global regulatory framework, based on existing examples: an international code on alcohol marketing, oriented to public health, along the lines of the International Code of Marketing of Breast-milk Substitutes; the scheduling of alcohol under the 1971 Convention on Psychotropic Substances, in view of the nature of alcohol as a dependence-producing psychoactive substance that is being abused so as to constitute a public health or social problem; or the adoption of a new international treaty, on the model of the Framework Convention on Tobacco Control (*65*). With regard to the last, the Committee recognized that, while there are many similarities between tobacco and alcohol as international commodities of public health significance, any such treaty would have to be tailored to the specific characteristics of alcohol and the nature of alcohol problems. Having considered the matter further, the Committee recognized that other options for proceeding might well be identified. Whatever its form, there is a need for a mechanism that will institutionalize the public health interest in alcohol as a special commodity, and will provide a frame for joint international action to reduce rates of alcohol-related problems globally.

7.2 Role of WHO

The Committee recognized that the international body most active in relation to alcohol has been WHO, and that its governing World Health Assembly has passed more than 10 alcohol-related resolutions. In 1979, the Health Assembly in resolution WHA32.40 recognized that "problems related to alcohol, and particularly to its excessive consumption, rank among the world's major public health problems."

A similar sentiment was repeated over 25 years later in 2005, when the Health Assembly recognized in resolution WHA58.26 on "Public-health problems caused by harmful use of alcohol" that "harmful drinking is among the foremost underlying causes of disease, injury, violence — especially domestic violence against women and children — disability, social problems and premature deaths, is associated with mental ill-health, has a serious impact on human welfare affecting individuals, families, communities and society as a whole, and contributes to social and health inequalities".

Over the 25 years since the previous report of the WHO Expert Committee on Problems related to alcohol consumption, WHO has undertaken

numerous major activities on public health problems related to alcohol. These activities provide the background for the continuing role of WHO in supporting Member States to reduce alcohol-related harm.

Sound alcohol policy needs to be based on accurate information on alcohol consumption and alcohol-related harm. This requires a clear definition of alcohol-related terms, particularly in the area of alcohol policy, standardized methods to measure alcohol consumption, and good information on levels and patterns of alcohol consumption — including unrecorded consumption — for different age and gender groups, particularly in low-income countries. It also requires a quantification of the health and economic risks associated with hazardous and harmful use of alcohol. Such information can be used to monitor trends in problems related to alcohol consumption, and the impact of policies and programmes to reduce the alcohol-related harm. Monitoring requires a global information system on alcohol that would best be based on the current WHO Global Alcohol Database. The Committee stressed the importance of the continuing work on comparative risk assessment for alcohol within the global burden of disease estimates, which provides up-to-date information on the harm done by alcohol.

WHO should continue to play a leading role in coordinating a global response to the global nature of alcohol problems, ideally through the development of a global action plan to reduce the harmful effects of alcohol consumption, assisting countries in the implementation, evaluation and monitoring of their own alcohol policies. This should be supported by a database of existing policies, laws, regulations and information on the effectiveness of policies and programmes, which should be used on a regular basis to communicate new findings on evidence-based alcohol policy measures and their implementation in different societal circumstances and at different levels of governance. Work on estimating the cost-effectiveness of policy options in different regional circumstances, as was done in the WHO CHOICE project (*33*), should also be developed and expanded.

Tens of millions of full-time paid health workers worldwide, as the key providers of health care, can take a leading role in reducing the harm done by alcohol. To put this into effect, WHO has a particular role in supporting the implementation and uptake of brief interventions for hazardous and harmful alcohol consumption, as well as the implementation of treatment and development of treatment systems for people with alcohol dependence and other alcohol-related mental and behavioural disorders.

The regional offices of WHO have an important role to play in discharging their responsibilities to provide public health leadership with respect to alcohol-related problems. Much has already been done with respect to building coalitions for alcohol policy at regional levels. The Committee

recognized the importance of regional differences and the value of regional specific initiatives and policy frameworks, such as the European Alcohol Action Plan, the Framework for alcohol policy in the WHO European Region, the regional strategy to reduce alcohol-related harm in the Western Pacific Region, and the minimum framework for alcohol control policy for the South-East Asia Region.

7.3 Collaboration between international bodies

The development and implementation of alcohol policies reach far beyond the health sector in a narrow definition, including matters in provinces such as agriculture, development and fiscal policy, education, employment and trade. The problems thus fall within the field of interest of a number of other intergovernmental agencies and organizations, including a number of specialized United Nations agencies. It is important that these other intergovernmental agencies face up to their responsibilities in the alcohol policy area, and therefore a continuing interagency working group on alcohol policy would be a useful mechanism, involving representation from the World Bank, the World Trade Organization, FAO, the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the International Labour Organization (ILO), among others. A global action plan to reduce the harm done by alcohol would provide a global focus and would support action at country and local levels.

International policies that deal with alcohol as an economic commodity can have important consequences for public health policy on alcohol. The Committee recognized the positive example of the World Bank, which, in 2000, recognized that investment in alcoholic beverages was sensitive, and mandated all its employees to be "highly selective" in only supporting projects in the alcohol field "with strong developmental impacts which are consistent with public health issues and social policy concerns" (*66*). The Committee recognized that the World Bank has played an important role in promoting tobacco policies oriented towards public health, and sees value in working with the Bank to consider a similar role for alcohol policies.

The public health interest in alcohol control is not adequately represented in trade negotiations and disputes, and the Committee therefore concluded that WHO and other health stakeholders should seek opportunities to work with national and international trade representatives to remedy this, and to urge national governments to ensure that the "health policy space" for future generations is fully considered when making WTO trade commitments, for instance in GATS negotiations.

The Committee valued the work that FAO has done in collecting and making available crop and other information used in estimating total consumption

of alcoholic beverages, and urged WHO to encourage FAO to continue and where possible enhance this valuable data resource.

The Committee recognized the importance of investing in young people for socioeconomic development and poverty reduction, and noted the value of joint work of WHO with UNESCO. Sound policy on youth should address some of the determinants of harmful drinking among young people, and effective policy on alcohol should increase the human capital of young people. The Committee identified as an international issue with public health significance within UNESCO's sphere of action the increasing involvement of promotion of alcoholic beverages in culture and the arts, particularly the massive investment of product placement in movies, television, music and music videos.

One of the oldest global agreements on alcohol is the 1949 Protection of Wages Convention of ILO, which forbids the payment of wages "in the form of liquor of high alcoholic content" or in taverns (except for the tavern's employees) (*67*). Since then, ILO has been active in trying to reduce workplace substance-related harm around the world, including through the publication of a code of practice on managing workplace issues related to alcohol and drugs (*68*). The collaboration between WHO and ILO in this area is valuable, in that the workplace provides several opportunities for implementing prevention strategies among adults.

7.4 Conclusions concerning implications for international action

The Committee concluded that WHO should take a leading role in coordinating a global response to the global nature of alcohol-related problems, including overcoming international impediments to effective policy-making on alcohol. This should include developing a global action plan to reduce the harmful effects of alcohol consumption, establishing mechanisms for international collaboration, and assisting countries in the implementation and monitoring of alcohol policies, according to their needs, culture and socioeconomic make-up. WHO should lead and stimulate an international dialogue concerning trade, smuggling, trade agreements, and other international aspects of the alcohol market that impinge on the ability of nations to combat alcohol-related problems within their borders.

Given that health is a key element of social and economic development, and that increases in alcohol consumption which usually follow such development can in turn threaten the health of individuals and society, the Committee concluded that WHO should promote the inclusion of alcohol policies in social and development agendas at the international level. This implies international collaboration with agencies such as the United Nations Development Programme (UNDP), the World Bank, ILO and WTO, among others.

8. Recommendations

The Committee's recommendations are built on an evidence base of alcohol policies which is globally relevant, but not necessarily adapted to specific societal circumstances. The Committee recognizes that specific cultural and legal contexts, as well as the local configuration of alcohol problems, must be taken into account in formulating and implementing evidence-based alcohol policy.

1. The Committee recommends that WHO:

   — continue to play a leading role in coordinating a global response to the global nature of alcohol problems;
   — undertake the development of a global action plan to reduce the harmful effects of alcohol consumption;
   — assist countries in the implementation, evaluation and monitoring of alcohol policies, according to their needs, culture and socioeconomic make-up;
   — liaise with intergovernmental agencies such as UNDP, the World Bank, ILO and WTO, and intergovernmental agencies at the regional level, to seek inclusion of alcohol policies in relevant social and development agendas.

2. Within the context of a public health approach to alcohol-related problems, the Committee recommends that WHO support governmental bodies at national and sub-national levels, and in particular in low- and middle-income countries:

   — to give high priority to the prevention of harmful use of alcohol, with an increased investment in the implementation of policies known to be effective;
   — to continue to review the nature and extent of the problems caused by the harmful use of alcohol in their populations, the resources and infrastructures already available for reducing the incidence, prevalence and impact of these problems, and the possible constraints in establishing new policies and programmes;
   — to formulate, develop and implement adequately financed action plans on alcohol with clear objectives, strategies and targets;
   — to establish or reinforce mechanisms and focal points to coordinate the work of public health stakeholders;
   — to implement and evaluate evidence-based policies and programmes, using existing structures where feasible.

3. Based on the substantive evidence base for the effectiveness and cost–effectiveness of alcohol policies and programmes in reducing the negative consequences of harmful use of alcohol, the Committee recommends that WHO support and assist governments, upon request:

— to regulate the availability of alcohol, including minimum ages for purchasing alcohol, hours of sale and density of outlets;
— to implement appropriate drink-driving policies based on low legal limits of blood alcohol concentrations that are strongly enforced;
— to reduce the demand for alcohol through taxation and pricing mechanisms;
— to raise awareness and support for effective policies. (In this regard, it is stressed that many commonly-used education and persuasion measures, for example school education programmes, mass media campaigns and warning labels, show little evidence of effectiveness in reducing alcohol-related harm, and therefore should not be implemented in isolation as alcohol policies).

4. Considering the detrimental effects of alcohol marketing measures on young people, the Committee recommends that WHO support and assist governments:

— to effectively regulate the marketing of alcoholic beverages, including effective regulation or banning of advertising and of sponsorship of cultural and sports events, in particular those that have an impact on younger people;
— to designate statutory agencies to be responsible for monitoring and enforcement of marketing regulations;
— to work together to explore establishing a mechanism to regulate the marketing of alcoholic beverages, including effective regulation or banning of advertising and sponsorship, at the global level.

5. The Committee recommends that WHO support and assist governments:

— to ensure that all people with alcohol problems in need of treatment have access to non-stigmatized and confidential evidence-based treatments and community services;
— to increase investments in the widespread implementation of early identification and brief intervention programmes for hazardous and harmful alcohol use in a wide variety of settings, including primary care, social welfare, accident and emergency departments, workplaces, and educational institutions;
— to expand capacity by educating and training professionals in health care, social service, and criminal justice settings, in implementing identification and intervention programmes;
— to give greater attention in treatment policies to the organization, integration and delivery of treatment services at the local, municipal and national levels.

6. In view of the need to provide a sustainable system for monitoring and surveillance of progress in reducing the harmful consequences of alcohol use, the Committee recommends that WHO:

— establish a global information system on alcohol, based on the current WHO Global Alcohol Database, with country-based counterparts, to bring together and analyse alcohol monitoring and surveillance information based on comparable data and agreed definitions;
— support the integration of relevant data from international agencies, such as FAO and the World Bank, into this system to allow continuation of current monitoring efforts, as well as to provide information for countries which have not yet established an alcohol monitoring and surveillance system;
— integrate policies, laws and regulations, and data on the effectiveness of policies and programmes into the information system, to help identify best practices and support Member States in shaping effective programmes;
— fully continue its comparative risk assessment of alcohol-attributable problems within the global burden of disease estimates.

7. In order to take advantage of the large and growing body of knowledge, and to sustain and implement evidence-based measures to reduce rates of alcohol-related problems, the Committee recommends that WHO:

— consider how its secretariat capacity can be strengthened to provide ongoing support to Member States in the area of developing, implementing and monitoring alcohol policy;
— use its best efforts to communicate with Member States on a regular basis new findings on evidence-based alcohol policy measures and their implementation;
— document, collate and disseminate practical experiences with the implementation of evidence-based alcohol policies in different societal circumstances and at different levels of governance.

8. Recognizing the role that nongovernmental organizations can play in supporting alcohol policy, the Committee recommends that WHO strengthen its processes of consultation and collaboration with nongovernmental organizations which are free of potential conflict of interest with the public health interest.

9. The Committee recommends that WHO continue its practice of no collaboration with the various sectors of the alcohol industry. Any interaction should be confined to discussion of the contribution the alcohol industry can make to the reduction of alcohol-related harm only in the context of their roles as producers, distributors and marketers of alcohol, and not in terms of alcohol policy development or health promotion.

10. Recognizing that alcohol is a special commodity in terms of its toxic and dependence-producing properties, with serious implications for public

health, and that mechanisms should be developed to protect the public health interest concerning alcohol in trade, industrial and agricultural decisions, the Committee recommends that WHO:

— stimulate a dialogue concerning those international aspects of the alcohol market which impinge on the ability of countries to combat alcohol-related problems within their borders, analysing the feasibility of international mechanisms, including legally binding agreements between countries, to support the implementation of alcohol policies and programmes;
— seek opportunities to provide an active and continuing presence in trade negotiations and dispute adjudications to represent the public health interest in alcohol trade matters;
— develop guidance that can be used by policy-makers and advisers at all levels of government to monitor and reduce the risks to alcohol policy that might be inherent in the process of trade liberalization.

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Annex

Summary of WHO data on disease burden attributable to alcohol in 2002

Table A1.1

Deaths attributable to alcohol consumption in the world in 2002

Disease category	Number of deaths (thousands)			Percentage of deaths as a proportion of the deaths attributable to the disease categories listed		
	Males	Females	Total	Males	Females	Total
Deaths caused						
Maternal and perinatal conditions (low birth weight)	1	1	3	0.1	0.3	0.1
Cancer	361	105	466	18.7	25.0	19.8
Diabetes mellitus	0	1	1	0.0	0.2	0.0
Neuropsychiatric disorders	106	25	130	5.5	5.9	5.5
Cardiovascular diseases	452	77	528	23.3	18.2	22.4
Cirrhosis of the liver	293	77	370	15.2	18.2	15.7
Unintentional injuries	501	96	597	25.9	22.7	25.3
Intentional injuries	220	40	260	11.4	9.6	11.1
Total "detrimental effects" attributable to alcohol	1 934	421	2 355	100.0	100.0	100.0
Deaths prevented						
Diabetes mellitus	–8	–5	–12	7.7	3.5	5.3
Cardiovascular diseases	–90	–130	–220	92.3	96.5	94.7
Total "beneficial effects" attributable to alcohol	–98	–135	–232	100.0	100.0	100.0
All alcohol-attributable net deaths	**1 836**	**287**	**2 123**	**100.0**	**100.0**	**100.0**
All deaths	29 891	27 138	57 029			
Net deaths attributable to alcohol as a percentage of all deaths	6.1%	1.1%	3.7%			

Table A1.2

Disability-adjusted life years (DALYs) attributable to alcohol consumption in the world in 2002

Disease category	Number of DALYs (thousands)			Percentage of DALYs as a proportion of the DALYs attributable to the disease categories listed		
	Males	**Females**	**Total**	**Males**	**Females**	**Total**
DALYs caused						
Maternal and perinatal conditions (low birth weight)	52	42	94	0.1	0.4	0.1
Cancer	4 593	1 460	6 054	8.2	12.9	9.0
Diabetes mellitus	0	20	20	0.0	0.2	0.0
Neuropsychiatric disorders	19 393	3 722	23 115	34.6	32.9	34.3
Cardiovascular diseases	5 711	887	6 598	10.2	7.8	9.8
Cirrhosis of the liver	5 415	1 468	6 883	9.7	13.0	10.2
Unintentional injuries	14 499	2 647	17 146	25.9	23.4	25.5
Intentional injuries	6 366	1 051	7 417	11.4	9.3	11.0
Total "detrimental effects" attributable to alcohol	56 029	11 297	67 326	100.0	100.0	100.0
DALYs prevented						
Diabetes mellitus	–225	–86	–312	21.3	6.7	13.3
Cardiovascular diseases	–834	–1 205	–2 039	78.7	93.3	86.7
Total "beneficial effects" attributable to alcohol	–1 059	–1 291	–2 351	100.0	100.0	100.0
All alcohol-attributable net DALYs	**54 970**	**10 006**	**64 975**	**100.0**	**100.0**	**100.0**
All DALYs	772 912	717 213	1 490 126			
Net DALYs attributable to alcohol as a percentage of all DALYs	7.1%	1.4%	4.4%			

Table A1.3

Percentage of all deaths attributable to alcohol consumption in 2000 and 2002 in WHO regions

	Males (%)		Females (%)		Total (%)	
WHO region	**2000**	**2002**	**2000**	**2002**	**2000**	**2002**
African Region	3.3	3.4	0.9	1.0	2.1	2.2
Region of the Americas	2.3	8.7	0.8	1.7	4.8	5.4
South-East Asia Region	2.6	3.7	0.4	0.4	1.6	2.1
European Region	10.2	10.8	0.6	1.7	5.5	6.4
Eastern Mediterranean Region	0.6	0.8	0.1	0.1	0.4	0.5
Western Pacific Region	8.0	8.5	0.7	1.5	4.5	5.2
World	**5.6**	**6.1**	**0.6**	**1.1**	**3.2**	**3.7**

Source: WHO